

# The Mining Journal


Established 1835

Railway & Commercial Gazette

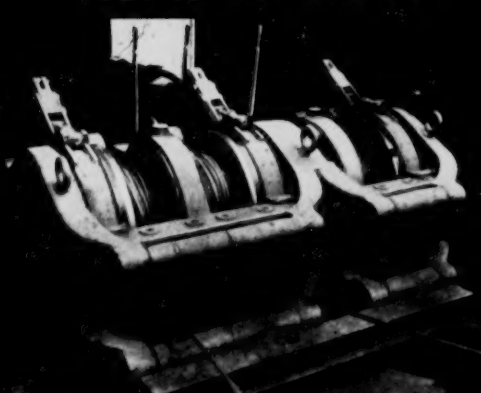
Vol. CCXLV No. 6273

LONDON, NOVEMBER 11, 1955

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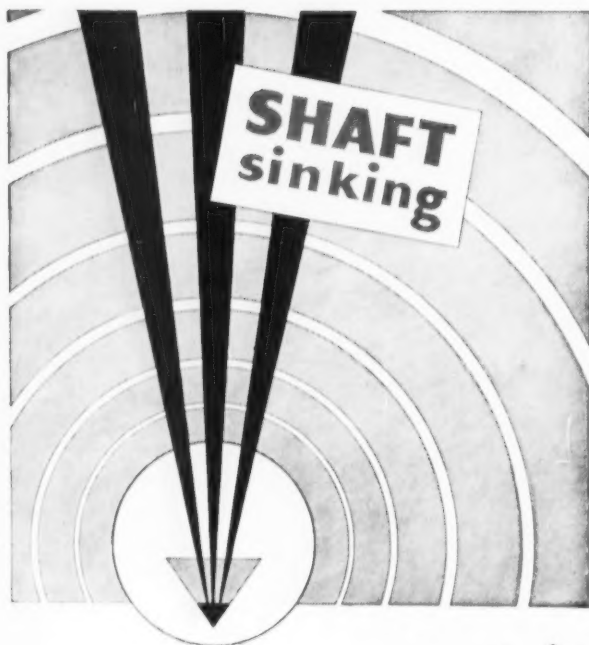
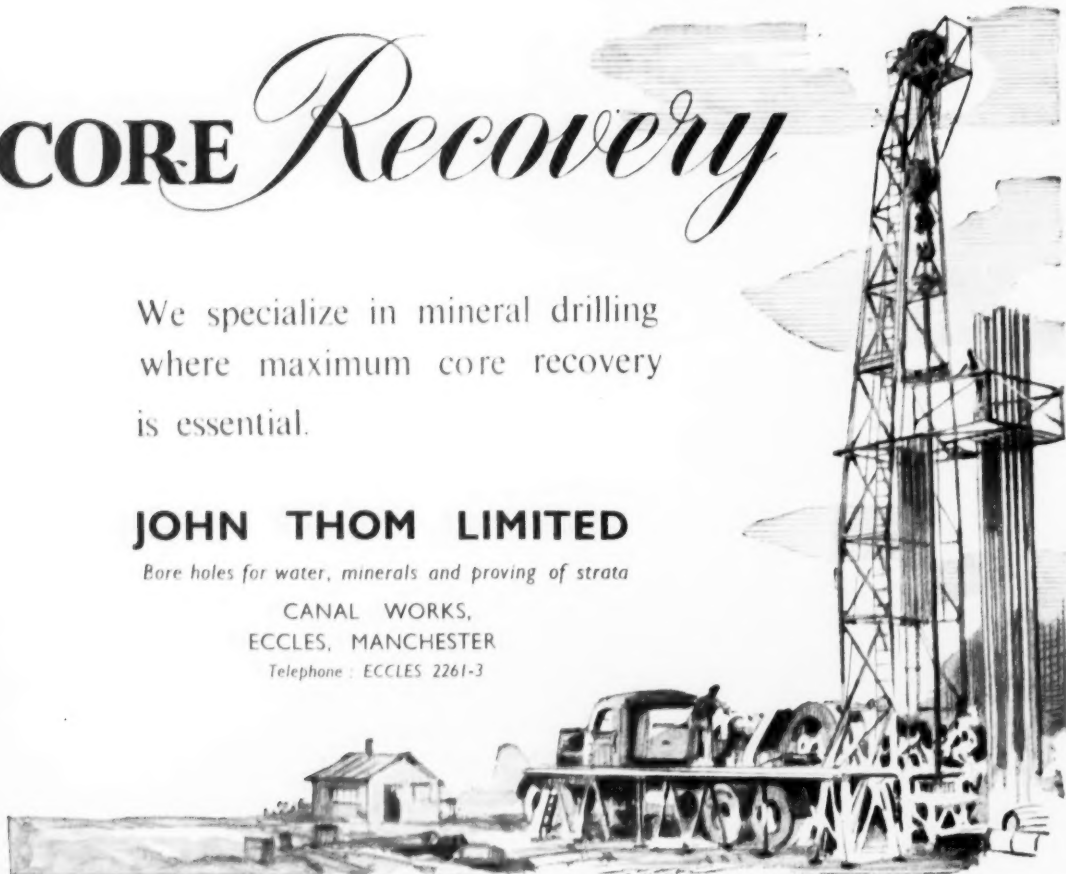
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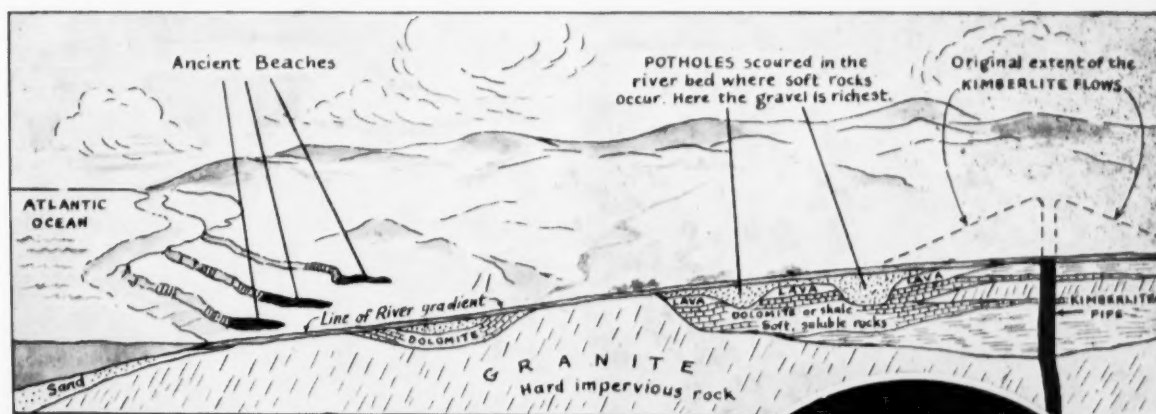


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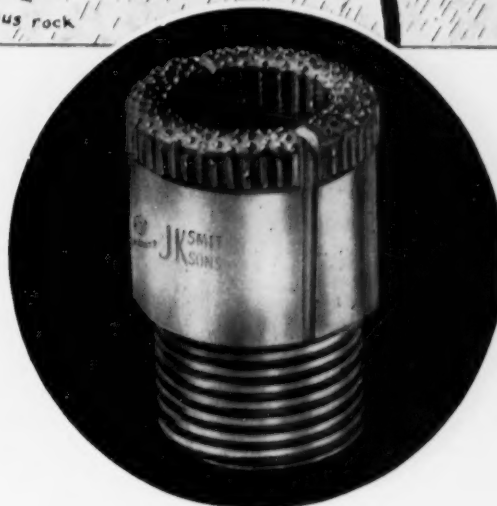
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# TEN MILLION TONS OF ROCK QUARRIED OUT OF MOUNTAIN TO BUILD CANADIAN CAUSEWAY



With the completion in only twenty-eight months of the three-quarters of a mile Canso Causeway, the Nova Scotia mainland and Cape Breton Island now have a new and vital link. Before its existence, all surface traffic over the Canso Straits went by ferry. Now, on a massive, dumped bed of rock quarried with the help of Atlas Copco rock drills, Sandvik Coromant Drill Steels and other equipment, a railroad track and highway have been laid, enabling trains, automobiles, and trucks to make their own way across the Canso Straits.

## WORLD'S DEEPEST CAUSEWAY

Though the Canso Causeway is quite short in length, it has the distinction of being the world's deepest with a maximum depth of 210 ft. At this point, rock at the bottom of the bed had to be spread over 800 ft. Altogether, rock was required for a distance of 4,300 ft. across the Straits and for 2,700 ft. along the shore. In helping to block the great depth of the Canso Straits, Atlas Copco rock drills, Sandvik Coromant Drill Steels and other equipment, were used in one of the biggest rock-moving jobs ever undertaken in Canada.



## 98 TUNNELS DRILLED

By the time the Causeway had been completed, 10 million tons of rock were blasted for its construction out of the side of Porcupine Mountain on the mainland. To do this, the contractors, the Northern Construction Company and J. W. Stewart Limited, decided on the coyote-hole method of quarrying. This entails driving small tunnels, loading them



with dynamite and then blasting. On Porcupine Mountain, ninety-eight such tunnels were drilled, each 3.5 feet high, 5.5 feet wide and 5 feet deep.

#### ONLY 8 ROCK DRILLS AT WORK

The ninety-eight tunnels eventually involved 18,000 feet of tunnelling. For this work the contractors employed a very small drilling force consisting of only eight rock drills. Of these, seven were Atlas Copco light rock drills. They were fitted with Sandvik Coromant tungsten-carbide-tipped drill steels. All this equipment was supplied by Canadian Copco Limited.

#### SMOOTH QUARRYING PROGRESS

Even using the coyote-hole method, eight rock drills are not many when it comes to quarrying 10 million tons of rock. Yet these few rock drills were able to keep 180 men and a fleet of mechanical shovels and dumping trucks continually active clearing broken rock. Atlas Copco light rock drills fitted with Sandvik Coromant tungsten-carbide-tipped drill steels are a unique drilling combination. The obviously smooth way in which quarrying operations were carried out on Porcupine Mountain is typical of the results this drilling combination is bringing to construction projects all over the world.

Atlas Copco Compressed Air Equipment is manufactured or sold and serviced in 48 countries throughout the world by the *Atlas Copco Group*, which embraces companies trading under various names such as Atlas, Atlas Diesel, Atlas Polar, Atlas Copco, Copco, Delfos and Sampa.

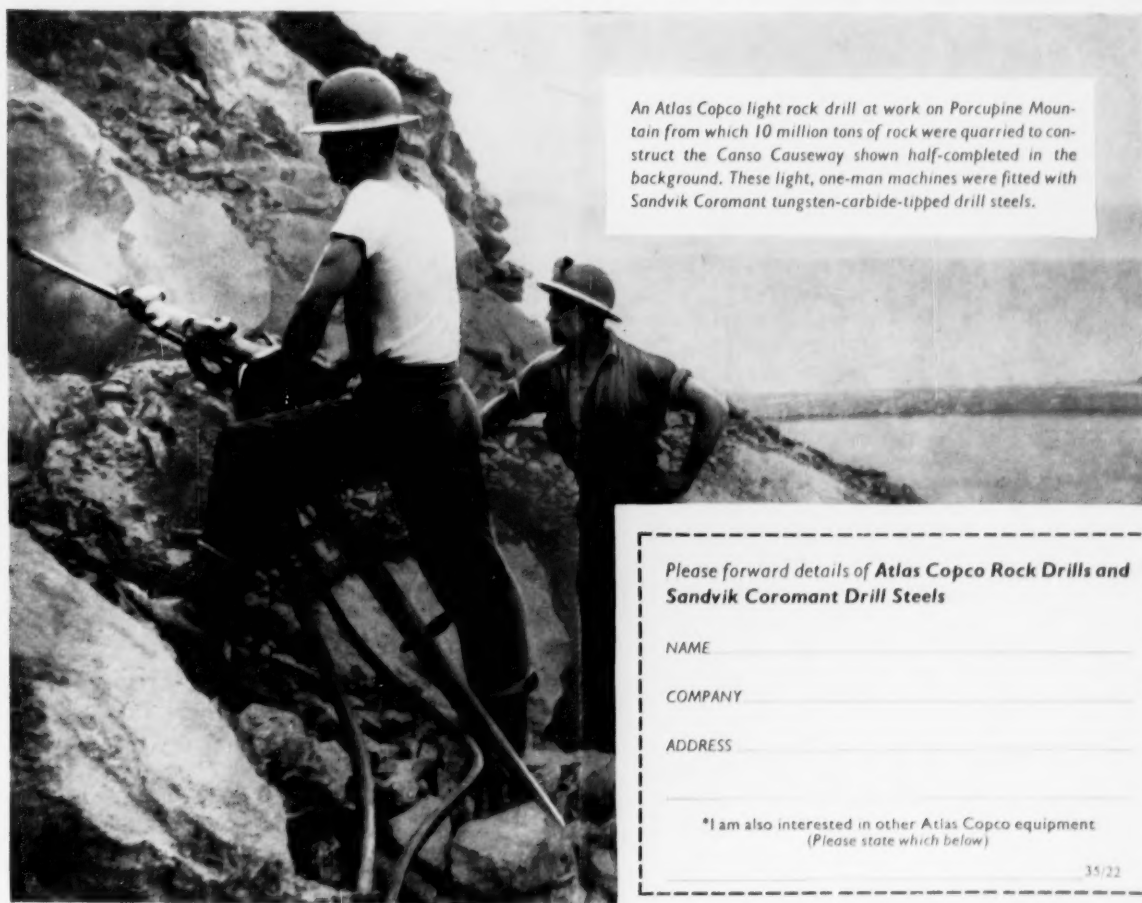
**MAIL THE COUPON BELOW** to the most convenient of the addresses given here:

UNITED KINGDOM, The Atlas Diesel Co. Ltd., Wembley, Middx.; FRANCE, Atlas Polar S.A., 29, Rue Marbeuf, Paris 8e; HOLLAND, N.V. Holland-Atlas, P.O. Box 6056, Rotterdam; ITALY, S.A.M.P.A., Viale Marche 15, Milan.

CANADA, Canadian Copco Ltd., Montreal, A.M.F.; AUSTRALIA, Australian Atlas Co. Pty. Ltd., P.O. Box 54, Auburn, N.S.W.; SOUTH AFRICA, Delfos Pty. Ltd., P.O. Box 504, Benoni, Transvaal.

U.S.A., Copco Pacific, Ltd., 930 Brittan Avenue, San Carlos, California; Copco Eastern, Ltd., P.O. Box 2568, Paterson 2, N.J.

*Readers in countries outside those listed above and who do not know the name of their local Atlas Copco company or agent, please write, in the first instance, to AB Atlas Diesel, Stockholm 1, Sweden.*



An Atlas Copco light rock drill at work on Porcupine Mountain from which 10 million tons of rock were quarried to construct the Canso Causeway shown half-completed in the background. These light, one-man machines were fitted with Sandvik Coromant tungsten-carbide-tipped drill steels.

Please forward details of **Atlas Copco Rock Drills and Sandvik Coromant Drill Steels**

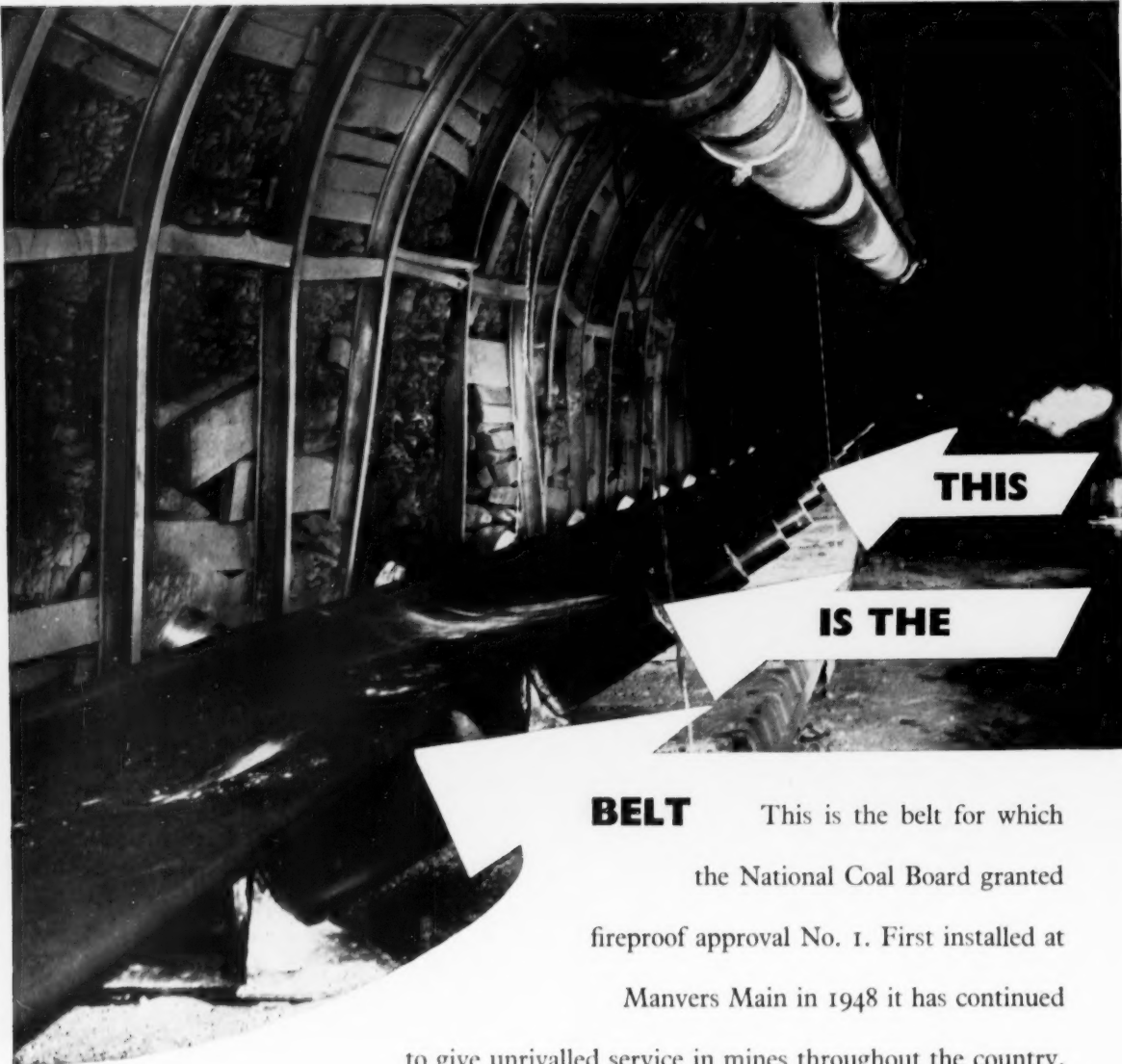
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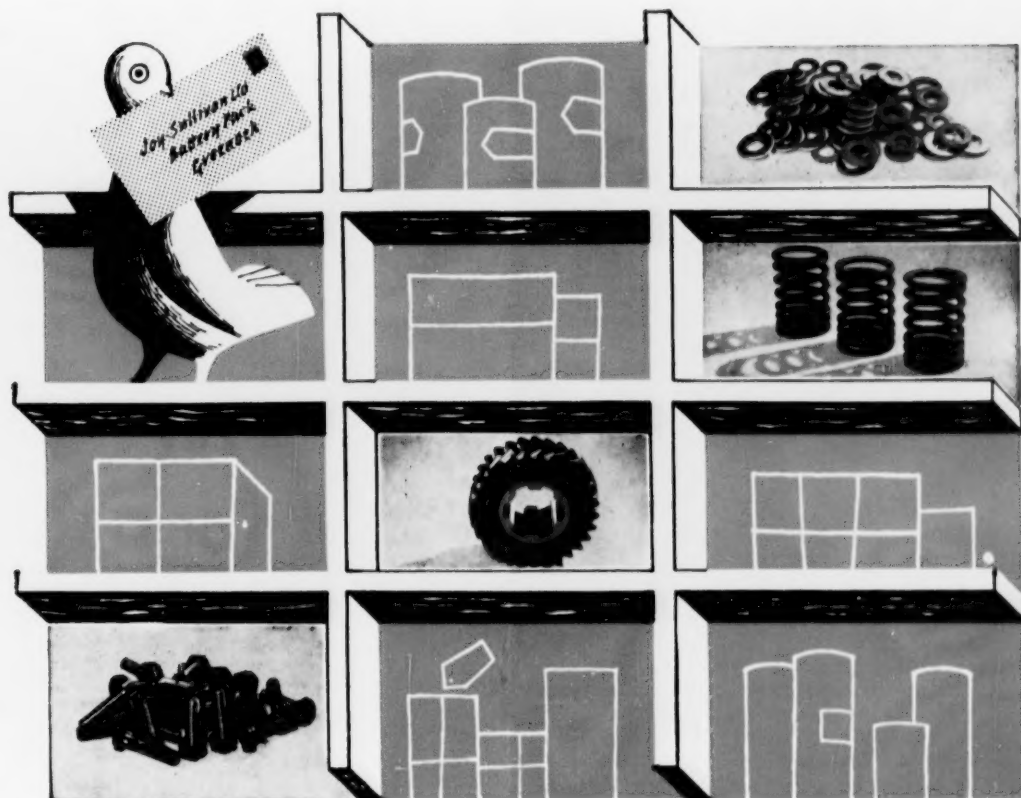
This is the belt for which the National Coal Board granted fireproof approval No. 1. First installed at Manvers Main in 1948 it has continued to give unrivalled service in mines throughout the country.

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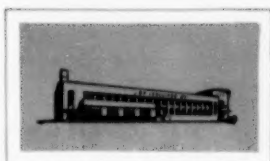


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# The Mining Journal

Established 1835

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## NOTES AND COMMENTS

### Coal—Future Raw Material of the Chemical Industry

Are people afraid to face the future of the coal mining industry in this country? Are the miners—and others—fearful that the coal industry will have no future at all when atomic power in bulk arrives?

Dr. J. Bronowski, in his recent address to the Association of Mining, Electrical and Mechanical Engineers, said he believed that they were and he proceeded to advance reasons why the fears are groundless. Except, perhaps, in the ranks of the National Union of Mineworkers, these fears are probably not so widespread as Dr. Bronowski thinks. The man-in-the-street is well aware of the vast capital expenditure now in hand that is based on an expectation of adequate coal even as far ahead as 20 or 30 years. He is, too, fairly conscious that coal can be used for other purposes than burning in chimneys; in fact, he has probably an understanding—clumsy and uncertain though it is—of that future that Dr. Bronowski describes with grace and precision.

He can already see coal as the raw material of the chemicals industry. The first step as Dr. Bronowski foresees it is the making of highly efficient smokeless fuels for homes and industry and this must be planned "so that it becomes a major outlet for coal between 1965 and 1975". The second is the integration of the chemical industry with coal. During the next 30 years coal mining, at present an extractive industry, will become "in an important sense a processing industry. The engineer will therefore surely be required to bring his coal to the surface in a form specially suited to the new processes. I would guess that some pits will put their whole output into the processing plant at the top, and will therefore make no attempt to mine and wind large coal. These pits will, if I am right, mine or drill out coal continuously, and perhaps pipe it up the shaft in water, cleaning it on the way."

These are fascinating thoughts but Dr. Bronowski arrives at them by some curiously uncertain reasoning. For instance, he argues a strong future for oil from coal by 1960 in the United States, as by that time it will be competitive with crude oil. "In this country the date is further off,

because production costs in the Middle East are still much lower than in America, and presumably we shall not go on indefinitely paying American prices as we do now." To attempt to decide now—even to within 10 years—when oil from coal will be competitive with crude in the United States seems a very risky business if only because the cost of power other than coal and oil comes into the calculation. What seems a good deal odder is the assumption that the United Kingdom will get oil from the Middle East at a cheaper price at a time when the cost of raising American oil has risen to a point at which oil from coal is competitive with crude.

This is the economics of Alice in Wonderland. Disregarding for a moment (if one can) the fact that the United States has a strong financial interest in Middle East oil, it is surely the case that the United States will get oil from that area at exactly the same price as the United Kingdom. What will determine whether the United States or the United Kingdom turns first to oil from coal is therefore the cost of raising domestic coal. One other thought is prompted by Dr. Bronowski's paper. He has shown that coal can have a glorious future; he has omitted to say that it could be having a glorious present. For how long will coal mining be the industry with the glorious future?

### The Role of the Technical Journal in the Export Market

In our note here last week on British mining machinery exports, we were concerned mainly with a problem peculiar to this industry in that for a substantial section of it the National Coal Board provides—at any rate in its more expansive moments—virtually full employment or the prospect of full employment. This circumstance is bound to have an erosive effect on the incentive to export. Moreover, with or without the will to export, no firm basis for developing export sales is possible so long as the forward requirements of the N.C.B. remain unpredictable. It may be nice for the coal industry to feel that British mining machinery manufacturers exist to serve their every whim, but whether such a state of affairs is in the best national interest is another matter.



This week we revert to an equally important, but less generally understood export problem, namely the use of editorial publicity overseas (as distinct from export advertising). This is a technique which has yet to be fully mastered and exploited by the majority of British engineering firms, and because, for the reasons already indicated above, many of our mining machinery manufacturers are so heavily committed to an assured home market, this section of our engineering industry is perhaps less *au fait* than most with the technique of editorial publicity.

Consequently, we particularly commend to its attention a pamphlet issued a few weeks ago by the Federation of British Industries entitled "Telling Industry's Story Overseas". This is an extremely handy little guide to the problems involved in the manufacturer telling the story of his product and service facilities to overseas markets. Except for the minority of firms who are already well-versed in these intricacies, this guide should be invaluable for its brief description of the types of news outlet available, the channels through which these outlets may be reached, and the best way of putting over the story so as to ensure that when the news outlet has been reached, the story will, in fact, be used.

The guide emphasizes the use which can, and indeed in the engineering industries must, be made of the many British trade and technical publications with substantial overseas circulation, in some cases running as high as 80 per cent. In this connection the guide makes the important, but often unappreciated point, that a good story in the appropriate British journal will frequently be picked up and reproduced by overseas journals with a similar interest circulating in a purely local market. Certainly it is a weekly occurrence for *The Mining Journal* to find itself quoted by its overseas contemporaries, and this is no doubt the experience of trade and technical journals serving most other overseas markets.

On the subject of the overseas circulations of British trade and technical journals, the guide has contrived, quite unintentionally to be somewhat misleading. It says "Many British technical journals have a world-wide circulation. Others are published expressly for export." It then publishes in an appendix a list of "Journals published in Great Britain mainly, or exclusively, for overseas." The italics are ours. It will not be readily apparent to the reader that the list in this appendix only relate to so-called export journals, i.e. those designed exclusively for the export market, and in many cases having only a "controlled" or free circulation.

What does not emerge from the appendix is that there is a very much larger list of influential British technical journals with high percentage export circulations, but which are not published exclusively for the overseas reader. *The Mining Journal* is a case in point.

There are other such journals covering this and practically every other industry represented in the appendix. To have failed to make clear the sectional nature of the list of journals in the appendix is a disservice to the exporter, as well as doing less than justice to the bulk of British technical publications selling abroad. We would suggest to the authors of this generally excellent guide that in subsequent editions—of which we confidently await several—there should be a more detailed list of trade and technical journals with overseas circulations, giving, where possible, certified circulation figures together with export percentage and its geographical distribution.

#### U.S. Minerals Policy at Work

We have had occasion of late to refer to the functioning of the U.S. Administration's minerals policy. What has been happening in the case of tungsten provides a good

illustration of the need for such a policy, and for considerable toughness in its operation in the face of the domestic mining interest.

The domestic tungsten industry operates quite a high powered public relations organization in Washington, which appears to be mainly concerned to assert the necessity of protecting domestic tungsten production as a strategic precaution. Typical of the party line is a recent statement to the Tariff Commission by Mr. W. Lunsford Long, president of the Tungsten Mining Corporation. Mr. Long is reported as saying: "Tungsten has been habitually catalogued by the Defense Department as a metal 'in short supply', but a Federal purchasing programme which has meant an assured market for tungsten has proved that charge completely false. Domestic production in 1954 was about three times domestic consumption. In other years, without a Federal programme, domestic production was less than half of domestic consumption. This proves that tungsten deposits exist in sufficient quantities to meet our requirements and the only variable which determines the degree to which the requirements will be met is the price. Since the final price is markedly influenced by the level of the tungsten tariff, that tariff determines the degree to which we can meet our own requirements out of domestic reserves. The theory that we are a 'have not' nation as far as tungsten is concerned has encouraged efforts to reduce the tungsten duty in order to encourage our foreign sources of supply of this vital metal. Now that the theory has been proven false a new and fresh look at our tungsten tariff policy should be undertaken. Since we have the capability of producing to meet our demands within our borders a new tariff policy may well be directed towards protecting this potential instead of placing emphasis on lowering the tariff on shipments from overseas sources."

It has long been an axiom of economic geology but there are always sufficient reserves of a given mineral *at a price*. Whether the price that Mr. Long would like his fellow industrialists to pay him for tungsten to enable him to produce it is in the best national interest when producers in other parts of the world are willing to sell to them more cheaply, is precisely the kind of problem which neither the United States nor any other similarly placed country can be expected to determine without a coherent minerals policy as a basis on which to take a decision.

## Australia

(From Our Own Correspondent)

Melbourne, October 30.

Australian mining interest in new directions has been depressed since the collapse of the oil enthusiasm, but the few potentially large uranium ventures are being watched attentively. Prominent is the Mary Kathleen uranium deposit, in the Mount Isa district of North Queensland, and which is jointly owned by Rio Tinto Ltd. and Australasian Oil Exploration Ltd. This is unquestionably the largest orebody so far found in Queensland, and may retain this leading position in Australia. The testing of this occurrence, which is in the open cut class, has involved the diamond drilling of 23,799 ft. of hole, so far, and it is stated that testing is approaching completion. Test work has shown that standard metallurgical techniques, with appropriate modification, are quite suitable for treatment. The Commonwealth Scientific and Industrial Research Organization has developed a novel method of treating uranium ores, which has been given the support of the Atomic Energy Commission for a pilot plant test. Preliminary work has been very promising. The main problem facing the future of the Mary Kathleen company is the securing of a satisfactory sales contract.

## DUCTING—II

# Manufacture of Flexible Mine Ducting in the United Kingdom

In the initial instalment of the following article which appeared in our issue of November 4, 1955, it was pointed out that the efficiency of all mine ventilation systems depends ultimately on the performance of the ducting used, and the article continued to discuss some of the research on flexible ducting that has been undertaken by the National Coal Board. In the concluding instalment appearing herewith, the various products in the ducting field currently being made available by manufacturers in the United Kingdom are described. The efforts being made to meet the requirements of efficient mine ventilation systems are of specific interest, and it will be noted that ease of transportation and installation, together with minimized air loss, economy and resistance to fire and corrosion, are factors which remain at the forefront of endeavour in flexible mine ducting manufacture.

Tests carried out at the N.C.B. Central Research Establishment have brought the overall conclusion that for the satisfactory and efficient ventilation of any underground heading, the duct used should be so designed, installed and maintained that its leakage coefficient—i.e. the volume of air leaking through 100 ft. of duct per min. at a uniform pressure of 1.0 in. W.G.—is not more than 10-20 c.f.m. The N.C.B. considers that this standard can be reached without difficulty.

The following information gives details of some of the products at present available in the United Kingdom.

British Belting and Asbestos Ltd. produce two qualities of brattice cloth having N.C.B. approval, Nos. B.C./1 and B.C./13. Both are manufactured cream in colour and are stamped with the appropriate approval number. They are normally supplied in 25 yd. rolls, in widths of 36 in., 45 in. and 54 in.

"Spiratube" flexible ducting, manufactured by Flexible Ducting Ltd., was developed during the second world war for use on warships where lightness, ease of storing and speed of installation was of the utmost importance. After the war the patent was released to industry and the same qualities of light weight, robust construction, ease of transportation and installation were found to be invaluable in mining and tunnelling operations. Flexible Ducting Ltd. is an associate company of George MacLellan and Co. Ltd., Glasgow.

## NON-COLLAPSIBLE DUCTING

It is claimed that the main advantage of "Spiratube" over ordinary fabric ducting is its ability to withstand minus pressure without collapse, while it is more easily transported and installed than metal ducting. When stored it will retract to 10 per cent of its original length, thus simplifying the task of conveying it to the working face. This is particularly important in export projects in the less developed parts of the world, where shipping space is costly and metal tubing prone to damage unless heavily crated. The weight of "Spiratube" is about a third that of metal sheet ducting, but its resilience enhances its tough construction. It will not dent, and should the fabric be torn, the repair is simple and requires no special apparatus. The outer cover can be either of heavily rubberized fabric or, alternatively, of PVC impregnated fabric.

Considerable work has been done on measuring both

friction loss and leakage rates on "Spiratube" and the results have proved extremely good. For example, a run of 1,000 ft. of 18 in. dia. tubing delivering 2,000 cu. ft. per min. to the face recorded a leakage of only 125 c.f.m.

Some hundreds of thousands of feet of "Spiratube" are in service in mines in the United States and France. This ducting has also become available in the United Kingdom, the manufacturing rights having been acquired by Flexible Ducting Ltd., and it is being used by the National Coal Board.

## FLEXIBLE VENTILATION TUBES

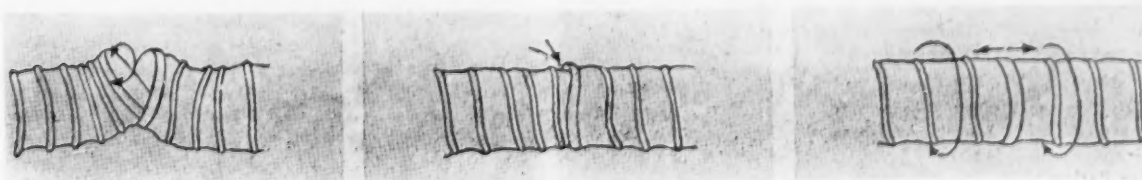
The Dundee Brattice Cloth and Waterproofing Co. Ltd. manufactures "Regentubes", which are flexible ventilation tubes, in 25 ft., 50 ft. and 100 ft. unit lengths. Special lengths can be made, if required. The diameters normally used vary from 12 in. to 24 in., but the manufacturers have occasionally made them as small as 6 in. and as large as 36 in. for special purposes.

The type in greatest demand is obviously intended to be an expendable item and consists of a cotton duck rot-proofed and waterproofed and made almost completely air-tight by the application of waxes and suitable chemicals. In this connection it is noteworthy that the company are waterproofing specialists.

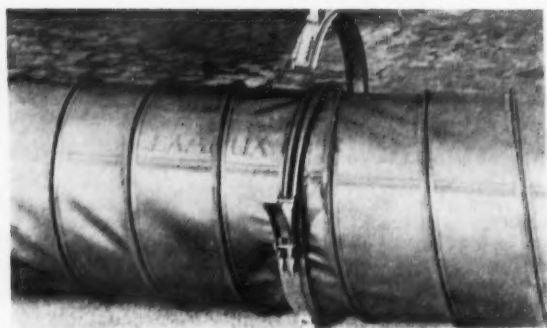
The durability of the tubes can be altered to suit circumstances by using heavier or lighter ducts as the basis material. The main production is taken up by the National Coal Board, but "Regentubes" are exported in considerable quantities to the Middle East, South America and Canada.

## JUTE-PVC COMBINATION

The Dundee Brattice Cloth and Waterproofing Co. do not themselves manufacture rubber-coated tubing, but their experience in the field of brattice cloth, dating back to the beginning of the century, made the combination of a jute fabric with a suitable PVC coating an ideal proposition for the production of non-inflammable "Regentubes". The fireproof brattice cloth, which has been approved by the N.C.B. under No. BC/19, was therefore adapted to the manufacture of the RP.20 quality of "Regentubes". A stronger fabric is required, of course, and greater care must be taken with the coating to ensure



Sections of Spiratube. The sections may be linked or detached in 10 seconds



Quick acting duct connecting clip on Flexadux ducting

an absolute freedom from pinholes, while keeping the total weight of the coated fabric as low as possible.

The fact that this type of tube is only slowly replacing the chemically treated cotton tubes speaks highly for the quality of the latter variety, especially when it is remembered that the price of the PVC coated product is no higher.

All "Regentubes" are fitted with special spring steel rings sewn into the ends, so that they can be coupled without any additional fittings. The manufacturers attach great importance to this feature, since there is difficulty in maintaining special clips for joining these rings in, say, 24 dia. under their normal conditions of use.

#### LEAKAGE PREVENTION

The product of The Greengate and Irwell Rubber Co. Ltd. is made from a strong base fabric and is well coated on both sides with a fire resisting PVC compound, which not only renders the material fireproof but prevents even the slightest leakage of air through the fabric. Porosity tests recently carried out on the proofed fabric indicated that the leakage of air through the fabric was too small to be measured and the PVC coated fabric has been fully approved for fire resistance by the N.C.B. Research Establishment.

In the preparation of the actual tube it is often necessary to sew two widths of processed fabric together. When this occurs special care is taken to ensure that, where stitching takes place, the stitches themselves are completely sealed using a fire resisting PVC solution. Brass eyelets are fitted on the seam along the length of the tube at intervals of 2 ft. and the strength of the basic fabric used is such that there is no danger of the eyelets pulling out when suspended in service.

The tubes themselves are usually supplied in units of 25 ft. in diameters ranging from 12 in. up to 30 in. Since it is necessary to join several unit lengths for one installation, design of the end fitting of the tubes is most important. The fitting should be simple to operate and designed to minimize air leakage at the joint. The fitting produced by The Greengate and Irwell Rubber Co. Ltd. is made from materials of a fire resistant nature. It is designed in such a way that one tube can be joined to the other in a simple manner with the aid of any additional or loose attachments. The end pieces are so shaped that air leakage is reduced to a minimum.

Wilkinson Rubber Linatex Ltd. hold the manufacturing rights in the United Kingdom for "Flexadux", a plastic material which has recently been developed on the Continent, where it is already being extensively used for mining ventilation.

"Flexadux" is a highly flexible plastic ducting which can

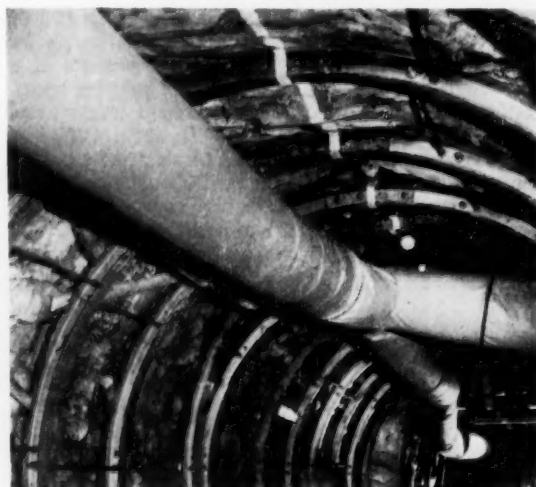
be collapsed into a very small space, thus facilitating both transport and storage underground. With the exception of steel coupling and stiffener rings, it consists of polyvinyl chloride plasticized with tricresyl phosphate. This material, which is 0.025 in. thick, is rot proof and age resisting. It will not support combustion and has a tensile strength of 3,200 lb. sq. in. It is suitable for use at temperatures ranging from -25 deg. C. to +60 deg. C. Ducts made from it are relatively immune to damage, due to their flexibility. In the event of damage, however, a repair can easily and quickly be effected by means of a simplified version of the welding process used in the original manufacture of the ducts. To prevent corrosion the steel coupling and stiffener rings are totally enclosed by a plastic covering, the stiffener rings being arranged externally on the duct so as to provide a smooth uninterrupted flow passage through the bore. Pressure losses due to unnecessary friction are thus almost eliminated.

#### PATENTED HINGE CLIP

To ensure an airtight connection between the lengths of ducting, and so minimize quantity losses, a patented hinge clip is used. The ends of the ducts, which are reinforced with steel coupling rings, are placed in the clip and pressure is applied by means of an adjustable lever integral with the clip, no tools being necessary. The clip can be quickly released, so enabling the ducts to be uncoupled for transfer to other working points.

The ducting is best installed by suspending it from either one or two guide ropes, hooks being provided at regular intervals for the purpose. The guide ropes should be fixed to the roof supports, or roofing, at intervals of approximately 25-30 ft. Where it is necessary to connect the plastic ducting either to an existing metal duct or to a fan casing, a connecting sleeve to suit the particular requirements can be supplied.

Three types of "Flexadux" are manufactured, each of which is available in various diameters. Type "S" incorporates a steel stiffening wire in continuous helical form and is suitable for both positive and negative pressures up to 20 in. water gauge. Type "B" is fitted with circular stiffening rings and is suitable only for positive pressure of 20 in. water gauge. The third type is intended only for emergency use. No steel supporting rings are incorporated and the ducts are coupled together by interlocking the end coupling rings.



Y junction in Pluvicor ducting



It is four years since this product was first introduced into European mines. This period of time has not, of course, been sufficient to establish its working life, since even the earlier installations are still giving very satisfactory service. Installation in the German and French mines is now proceeding at the rate of approximately 250,000 ft. per annum.

The Heinrich and Theodore Mine at Essen Ueberruhr, Western Germany, have prepared a full report on the behaviour of "Flexadux" installed underground. The resultant information reveals that the pressure loss per 100 m. length on metal ducting of 500 mm. dia. exceeded by 13 per cent the loss from "Flexadux" of the same diameter installed in the same ventilation line, and that quantity losses for the metal ducts varied from 5 per cent to 27 per cent depending on their condition, whereas the "Flexadux" showed a loss of only 0.5 per cent of the air being passed.

### FIRE RESISTANT DEVELOPMENT

BTR Pluvicor flexible air ducting, manufactured by the British Tyre and Rubber Co. Ltd., is a fire resistant development of conventional flexible ducting for auxiliary ventilation in coal mines. Besides being fire resistant throughout, it incorporates all round technical improvements and is consequently very suitable for coal mining conditions. It retains the known advantages of the ordinary product, but is lighter, stronger and more compact.

Woven from synthetic fibres the fabric combines lightness with great strength and toughness. It is waterproof, mildew-proof, water repellent and immune to the attacks of fungi. It is also claimed to be highly resistant to the alkaline and acid waters of mines. The light grey finish reflects the limited light available in mines.

The tightly woven fabric is practically impermeable, while the seams are strong and are bonded with Pluvicor compound, which renders them leakproof. Coupling rings of an entirely new and exclusive design ensure that thoroughly leak-proof joints can be easily and rapidly made. Tests have shown that the leakage coefficient is of a very low order.

### COUPLING METHOD

The only action that is required to couple lengths is to compress, by hand, the ring at one end and slip it into that at the end of the next length; on being released, the ring immediately springs back into shape. The whole operation can be carried out in a moment and dismantling is equally simple. "Y" junctions, T pieces and elbows are available and are provided with suspension eyelets top and bottom, enabling them to be reversed as required. Thus separate sets of junctions for alternative requirements are not needed. Reducers for coupling ducting of different diameters and fitted with built-in coupling rings can also be supplied.

For installation in the vertical, special suspension collars fit snugly around the coupling rings and are supported by wires fixed to the timbering of the mines. For installation in the horizontal, hooks are inserted in the brass eyelets and hung from suitable suspension wires fixed to the wall or roof of the mine.

Should the ducting become damaged, it is easily repaired by cleaning the damaged area with carbon tetrachloride and then applying BTR solution 15161 both to the ducting and to a patch of new Pluvicor material.

Pluvicor ducting remains free from hardening and cracking even when stored flat.

## Lead Production in French Morocco

Output of lead concentrates (72 per cent) increased from 110,393 tonnes in 1953 to 114,419 tons in 1954. The Zellidja-Penarroja lead smelter at Oued-El-Heiner processed 42,406 tons of lead concentrate during the year and produced 26,688 tons of lead metal and 12,992 tons of lead slag. These facts are contained in *Mineral Trade Notes*, Vol 40, No. 5, published by the U.S. Bureau of Mines.

Aouli, the more important of the mines, is in the upper Moulouya River valley, approximately 25 kilometres north of Midelt, and is owned by Société des Mines d'Aouli. The deposits are developed by tunnels and shafts and broken ore is moved by tractor trains and cog railway to the concentrating plant.

The crude ore contains 4.5 per cent lead, of which 3.9 is in galena and 0.6 in cerussite with traces of silver (which is recoverable), copper and bismuth. The concentrator operates six days a week and processes 1,000 tons of ore a day, producing a 76 per cent concentrate.

Storage facilities at the plant can handle 3,000 tons of ore, which is subsequently hauled to the top of the plant and placed in a circular crusher at the rate of 77 tons an hour. The crushed ore is then screened to produce material of three sizes: over 40 mm., 8 to 40 mm., and under 8 mm. Crushed ore over 40 mm. is placed in a large Huntingdon Heberlein sink-and-float installation capable of treating 24 tons of ore an hour. Ore under 8 mm. is placed in one of two Hancock jigs (combined capacity 25 tons an hour).

### THE MIBLADEN PLANT

The Mibladen mine, also worked by Société des Mines d'Aouli, is in an open plain roughly 15 kilometres north of Midelt. The ore deposits consist of concentrations of lead minerals in a bed of calcareous rock having an average thickness of 1 m. and overlain by 4 to 5 m. of country rock. The ore-bearing stratum is extensive and open-pit mining already extends along an axis a mile or two in length. The overburden is removed by three 1,200 litre steam shovels and loaded into trucks, after which the mineralized stratum is broken up by explosives and the resulting material hand picked and screened by women workers. This process increased the metal content of the ore from 2 to 5.5 per cent.

The enriched ore is loaded onto tractor trains and then trucks for delivery to the concentrating plant. A second calcareous ore-bearing stratum has been located some distance below the upper mineralized bed. A sloping shaft has been sunk about 30 m. for eventual development of the underlying deposit.

The ore contains about 5.5 per cent lead, 70 to 80 per cent of which is in cerussite and the remainder in galena. The plant processes 650 tons of ore a day and produces a 72 per cent concentrate. The ore is crushed and screened to produce material in three sizes of over 10 mm., 3 to 10 mm., and under 3 mm. Ore over 10 mm. is returned to the crusher; 3 to 10 mm. is placed in one of two Hancock jigs; and ore under 3 mm. is ground fine and placed directly into the American-made flotation train, together with products from the Hancock jigs.

The concentrate from the Aouli and Mibladen plants is shipped to Northern France for smelting at the Penarroja smelter at Noyelles-le-Godeau. Hydro-electric power for the two mining operations is provided at two dams, one on the Moulouya River and a smaller one on a river south of Midelt.

## CHEST DISEASES—I

# Occupational Chest Disease in Gold Mine Labour in South Africa

The following article, the first of two instalments, describes the incidence of occupational chest diseases in operating personnel of the South African gold mining industry. The article is condensed from a paper presented at the McIntyre-Saranac Conference on Occupational Chest Disease at Saranac Lake, New York, during February of this year, by G. W. H. Schepers, director of the Saranac Laboratory. A concluding article will describe chest diseases in relation to their incidence among mine workers in Canada, the United Kingdom and the Kolar Gold Field, South India. All the papers were published in the American Medical Association Archives of Industrial Health.

The influence of engineering and medical intervention on the course of occupational chest diseases among gold miners in South Africa is of major importance because of the magnitude of the mining venture, the vast labour force involved, the determined efforts made by the government to prevent disease, and the long period over which this project has been in operation. Not only are the South African gold mines numerous and spread over a wide area but the majority are also extremely deep, with depths of over 7,000 ft. common while in some mines 10,000 ft. levels are being worked.

## A LONG-TERM PROGRAMME

Long term governmental studies on the effects of environmental hazards upon operating personnel have been made for the scheduled mines only. Yet most of the studies completed as regards African labour are inadequate owing to the fact that the African labour force works at the mines intermittently, a factor which promotes many problems. Indeed, less than 2 per cent of Africans are radiographed annually from the point of view of silicosis, although all are subjected to 35 mm. radiography at a central recruiting station before commencing underground service. The labourers are studied periodically at the mines by medical officers who are responsible to the Silicosis Medical Bureau as well as to the mine managements.

The first decade following the discovery and incipient mining of gold on the Witwatersrand was not too disastrous from the point of view of chest diseases, and tuberculosis had not yet made its impression as an infecting agent on any significant scale. Governmental commissions took over and defined the conditions of miners' phthisis as a dual disease involving both silicosis and complicating tuberculosis, and the condition became certifiable as a compensable disease.

The phase of enlightenment relating to occupational chest diseases among South African miners began with the establishment of the Miners' Phthisis Bureau in 1914, and by 1930 the general production rate for silicosis had dropped to 13.79 per 1,000 from 27.87 per 1,000 in 1920. The average dust counts in the mines had been reduced to 284 particles per cu. cm. or about 7,000,000 particles per cu. ft. The fight for underground health received a fillip in 1951 when, following the recommendations of the Beyers Report, the Silicosis Act (1952) was passed. One effect of these activities being that more thorough methods of investigation revealed that many pulmonary-disability applicants—especially Africans—suffered instead from silicosis or tuberculosis previously undetected by the Bureau.

By 1954 more than 700 new cases of pulmonary disability had been identified among European miners and approximately 100 cases amongst Africans. During 1953-1954 more than 1,700 new cases of silicosis were demonstrated, more than 1,100 new cases of tuberculosis were discovered among Africans, and tuberculosis and silicosis were detected in more than 800 cases in addition.

The outstanding liability for the mines in respect of com-

pensation for these diseases has exceeded \$150,000,000, and currently the mines are paying in addition more than \$10,000,000 per year in direct costs. To these sums must be added the vast amounts expended annually on engineering hygiene measures and the capital unproductively assimilated towards this end. Even more disconcerting is the realization that the total African labour force exposed to mine dust has increased by approximately 20 per cent during the last 20 years—it is now about 300,000 men—and that the discovery of more than 3,750 cases of occupational chest disease among these Africans means an incidence one-fourth as high among Europeans.

The spectacular initial decline—in so far as white miners are concerned—in the annual rate of production of silicosis, tuberculosis and silicosis combined with tuberculosis, is revealed by statistical research. An all-time low rate of approximately 200 cases had been achieved by 1950, but despite this record, by 1954 the annual rate of certification had exceeded by three times the highest rate ever recorded at the time when pulmonary disease was previously present at its worst.

Of the 789 cases certified in 1917, for instance, among 15,000 miners, 247 were in a stage equivalent to the second stage and 382 were in the third stage. In the year 1953-1954, more than 770 second stage silicotics and more than 400 third stage silicotics were discovered.

Progress in respect of control over silicosis is manifested through the diminishing proportion of fatalities and the longer survival of silicotics. Of the 1917 and 1921 groups of new silicotics, less than 23 per cent survived after a lapse of 30 years, the majority having died within 10 years of the date of certification, whereas of the 1941 group only about 30 per cent had died within 10 years of the date of certification.

## OVERALL PROGRESS

Despite these statistics the problem of occupational chest diseases among South African gold miners may be summed up as revealing favourable overall progress. The indications are that too much harmful dust is still being inhaled underground. Assuming the generally "satisfactory" dust levels reported in official statistics are representative of mining conditions at all times, the conclusion must be reached that the dust level of 200 particles per cu. cm. (approximately 5,000,000 particles per cu. ft.) is not yet satisfactory.

The overall medical care accorded both European and African mineworkers is of a particularly high standard in South Africa, the methods employed to ensure the maximum welfare of the African labour force, for example, being general throughout the South African mining industry. Medical care of African mineworkers was described in *The Mining Journal* of October 21, 1955, when the Anglo American Corporation Group was taken as an example of the effort prevailing throughout the industry as a whole and the vastly improved statistics relating to African mortality and disease were emphasized.



# A Pioneer of Underground Mechanization

In no department of the coal mining industry is mechanical equipment of greater value than in the actual production and removal of coal from the face. Prominent among the pioneers of underground mechanization was the late Richard Sutcliffe, inventor of the first underground belt conveyor and of a number of important improvements in connection with coal cutters and other mining machines. His achievements have been recorded by R. J. Sutcliffe, Chairman of Richard Sutcliffe Ltd., and E. D. Sutcliffe in a book entitled *Richard Sutcliffe*, privately printed by T. and A. Constable Ltd. The following article offers a précis of the facts presented in this interesting work wherein an epilogue by H. Street, technical director, briefly reviews the company's current products.

Richard Sutcliffe was born on a farm in County Tipperary, Ireland, on January 26, 1849, and started his mining career without influence or means.

One day when he was 18, the course of his life was changed as the result of a short conversation with a mining engineer, Joseph McCarthy Meadows, who came to the farm on business. Mr. Meadows had become general manager of the Wolfhill Colliery in Queen's County for the Leinster Colliery Co. Ltd. He mentioned that he required a clerk for this colliery and offered the post to Richard.

## EVIDENCE OF ABILITY

At Wolfhill the future inventor gave abundant evidence of his ability and mechanical genius. While cashier of the company he sat for and passed his examination for a Manager's Certificate. One of his earliest achievements was the solution of a substantial and difficult problem arising from a decision to replace existing 9 in. pumps with a set of 18 in. units. The advice of several mining engineers was taken and there was general agreement that it would be necessary to make a lodgment in the mine sufficient to hold a very considerable flow of water. Richard Sutcliffe was able to show how the cost and delay of making the proposed lodgment could be avoided. This led to his first contract to do work in the mine, which was successfully completed.

It was during the year 1876 when, having undertaken the underground surveying in addition to other duties, that he succeeded in carrying out a most accurate survey, with the aid of only a loose-needle miner's dial, in a drift in which the needle was affected by iron compressed air pipes. This he accomplished by angling with a loose needle—a system which is now well known but which the young man had to think out and discover for himself.

## IMPROVED DESIGNS

By 1891 Sutcliffe had acquired considerable experience of coal winning in both Ireland and England and it was about that time that he began to devote himself seriously to the provision of new machines. He had already taken out a patent for a machine designed to speed up pit sinking, which was described in a paper read before the Manchester Geological Society in May, 1900. He described it as a machine which cut an annular groove or channel to a depth of 3 ft. in advance of the sinking around the periphery of the sinking pit, and which would dispense with all shot-firing in the vicinity of the sides or walls and all manual labour connected with the dressing of the sides. He also devised and patented an apparatus for lining the wall of the pit with concrete concurrently with the sinking. One of the sinking machines was made at a cost of £700 or £800 and was designed to work by compressed air. In 1892 Sutcliffe accepted a contract for sinking a pit at Rylands Main, Barnsley, where he installed the machine, but after he had gone down 40 or 50 ft. sinking of the pit had to be abandoned by the owner.

In the same year the inventor also took out a patent for a coal-cutting machine. He considered that existing coal-cutters were excessively complicated, badly designed, and

unduly liable to breakdowns. Apart from its greater simplicity, the most important feature of the machine which he invented was that—for the first time—the cutting tools were not set directly into the rim of the disc, but were fixed in cutter-boxes which were detachable from the wheel. Sutcliffe's name was long connected with this machine, which was manufactured under licence and achieved a large sale.

While Richard Sutcliffe's inventions in connection with coal cutters were improvements in machines of a type already existing, his conveyors constituted an entirely new and original type of machine.

Though belt conveyors were in operation on the surface fifty years ago, they were unsuitable for underground work. Coal was loaded into tubs at the coal face and pushed or hauled by boys and ponies to the tram road or gate, and thence by rope haulage to the pit bottom. When the Blackett trough and chain scraper conveyor was introduced, Sutcliffe thought this method could be improved upon. He believed that the ideal method was a belt conveyor to carry the coal, if it could be made to work satisfactorily in the confined space and arduous conditions underground.

## THE FIRST PLANT

By his usual method of concentrated thought the inventor succeeded in solving the problem and after some rough experiments with a small domestic mangle equipped with rubber-covered rollers, he was satisfied that his theories were correct. As a result, he applied in 1905 for several patents, one for the driving head with the now well-known multiple drums, with a spring-loaded jockey roller, one for suitable standards, and one for a gate conveyor to take delivery from the face conveyors. A factory was acquired at Horbury, 2½ miles from Wakefield, and in October, 1905, the manufacture of these conveyor inventions was started in the original Universal Works. In the same year, the first six underground belt conveyors in the world were ordered by the Glass Houghton Colliery Co. They were to work in a coal face which had been set out for 660 yd. with three gates, each 220 yd. apart. Carrying the essential elements of the most modern conveyors of to-day, they ran at 200 ft. per min. and were said to be capable of handling 500 tons per day.

In 1905 Sutcliffe read a paper, "Notes on the Working of a New Belt Conveyor for a Thin Seam", before the Yorkshire Branch of the National Association of Colliery Managers at Barnsley. At a subsequent meeting he prophesied that coal might be conveyed from the face, 1,000 yd. below ground, to the screens on the surface. Little could those listening to the papers and participating in the discussions which followed have realized that they were listening to proposals which would revolutionize the transport of coal underground. It could scarcely have seemed possible, for example, that the entire output of a Derbyshire colliery, amounting to 840 tons per hour, would be handled by a series of conveyors of Sutcliffe design and manufacture.

Richard Sutcliffe died in 1930, but the small works he started fifty years ago continues under his name in a vastly increased form.

## Developments in the World Coal Mining Industry

In many parts of the world there has been considerable success with mechanical mucking when sinking pits but so far in the United Kingdom, little success has been achieved. Now, in the North-Western Division N.C.B., a sinking scaffold has been developed which it is believed will make mechanical mucking possible. To the design of the Division's Production Department, the Cementation Co. Ltd. is constructing the scaffold for the new Agecroft No. 5 shaft.

For the Agecroft shaft the grab is of heavy welded plate construction, fitted with hardened teeth. The placing of the grab on the shaft bottom or over the hoppit is in the control of a man sitting on a platform on the main hoist frame. This main hoist frame is carried on running rails fixed below the sinking scaffold in such a manner that with suitable power and gearing the hoisting frame can revolve about the shaft centre, placing the grab in any given circumferential position.

Suspension of the scaffold is by means of four ropes from a winch on the surface. The satisfactory tensioning of the scaffold suspension rope is essential, since these ropes serve as guides for the raising and lowering of the hoppit. During firing operations the scaffold will be wound up the shaft to a convenient height in the normal way.

### OVERWIND SAFETY ATTACHMENT

A safety device has been developed in the East Midlands Division N.C.B. for Black's Overwind and Overspeed Controller to provide automatic tripping of the controller's emergency system when oil in the hydraulic system drops to danger level. The essential feature of the device is a B.T.H. shuntwound solenoid, connected to the controller in such a way that when the solenoid is de-energized, the controller is tripped. Two stages of control are provided, namely an illuminated No Oil warning sign, and the trip which comes into action if the initial warning is ignored.

Inside the fluid head tank, and solid with it, is a tube of non-magnetic material, inside which a float of magnetic material drops down within the tube as the oil level falls. Three coils, adjustable to any setting, are clamped around the outside of the tube and connected to a relay circuit. As the oil level drops, the float passes into the fields of the successive coils, altering their impedance. Through the medium of the relay, when the float reaches the second coil the No Oil sign is illuminated. A further drop in level brings the float into the field of the third coil, the solenoid is de-energized, and the controller is tripped.

The device has also been adapted to trip the controller and bring the winding drum to rest if winding begins before the keps have been withdrawn from beneath the cage.

### CHEMICALS FROM COAL PLANT

Union Carbide and Carbon Co., United States, hopes to be able to start construction of its plant for producing chemicals from coal within "the next year or two", according to Dr. J. Davidson, vice-president. He said that the development of the coal hydrogenation process had been a long task.

The company believes that a plant capable of handling 1,000 tons of coal daily is the minimum size for economy. The process, which has been running experimentally, produces a large variety of chemicals from coal, many of them substances which have never been made commercially before.

## REVIEWS

**Annual Report, 1954-1955.** Published by the British Standards Institution. Pp. 242, with Index. Price 5s. net.

This Annual Report of the British Standards Institution for the year ended March 31, 1955, contains a review of the very wide range of activity which the Institution now embraces. The introductory General Report refers to two fields, namely Codes of Practice and Consumer goods, while a new section of the Divisional Reports is devoted to the work of the Council for Codes of Practice.

The largest section of the report is naturally concerned with the projects for British Standards which have been under consideration during the year by some 60 major industries. This section includes notes on some of the more important standards issued during the year and on significant developments which have taken place on other projects. In this section can be found the projects for such items as instruments to measure air pollution, steel plate, the screw thread, and zinc alloy die casting. Among mining requisites are those equipments appertaining to collieries, as well as electrical units of all types and specifications relating to iron and steel.

**Prospecting for Atomic Minerals,** by A. W. Knoerr and G. P. Lutjen. Published by McGraw-Hill Book Co. Inc. Pp. 211, with illustrations. Price \$3.95.

The authors of the work under review are respectively chief editor and managing editor of *Engineering and Mining Journal*. In simple and non-technical terms they have revealed how the average man possessed of little or no knowledge of mining or geology can prospect for atomic minerals.

The information presented is based on interviews with experienced agents and prospectors and as such must be considered sound. In addition, modern equipment, basic surveying instruments, radiation detectors and the use of maps are thoroughly explained, as are health precautions. Methods of claim staking and related practice are given in full, and State and Federal mining laws detailed.

The whole is by its nature extremely simple in tone, but its value is obvious and its possible benefit to the layman prospector is potentially very great.

**The Determination of Southern Rhodesian Economic Minerals,** by N. E. Barlow, B.Sc. *Southern Rhodesia Geological Survey Bulletin No. 42*, issued by the S.R. Geological Survey. Pp. 33, and with map supplement.

This useful bulletin has been produced in the belief that there is need for a concise guide to the determination of the economic minerals occurring, or likely to be discovered, in Southern Rhodesia. It is not a text-book on mineralogy, but a guide to the structure of indigenous minerals and a compilation of the tests necessary to their recognition. None of the tests described calls for apparatus beyond the means of the average prospector or small worker.

**Die Erzlager des Rammelsberges bei Goslar,** by Emil Kraume, with the co-operation of F. Dahlgrun, R. Ramdohr and A. Wilke. Published by Gesellschaft Deutscher Metallhütten und Bergleute e.V. Pp. 394, and with 47 pages of maps and illustrations in addition.

Published in German, the work under review describes the lead-zinc deposits at Rammelsberg near Goslar, and is the fourth in a series entitled *Monographs on German Lead-Zinc Deposits*.

The book gives a full description of the geological formation of the Rammelsberg deposits.

## MACHINERY AND EQUIPMENT

### Opencast Coal Site

Between 8,000,000 and 10,000,000 tons of first quality coal will be produced from an opencast mine in Northumberland on which work will continue for the next 10 years. The National Coal Board announced at the end of October that the contract for working this site had been let to James Miller and Partners Ltd., of Edinburgh, and that work on the site had begun.

This site, known as the Radar Site, is the third, and largest, of the outstandingly large opencast mines programmed by the National Coal Board; and on it, five of the seams which have yielded much of the best coal exported to the Continent will be worked. It is on the coast at Druridge Bay, north of Newcastle, and 11 miles north of the Acorn Bank Site where coal production started in the last week of October, one month ahead of expectations.

The new mine will be partly operated by two of the largest standard walking dragline excavators in the world which weigh 1,500 tons each and can use a bucket of 35 cu. yds. capacity taking about 50 tons at a bite. These machines have been hired by the contractors from the N.C.B. When maximum output is achieved at the site, it will be at the rate of between 750,000 and 1,000,000 tons a year.

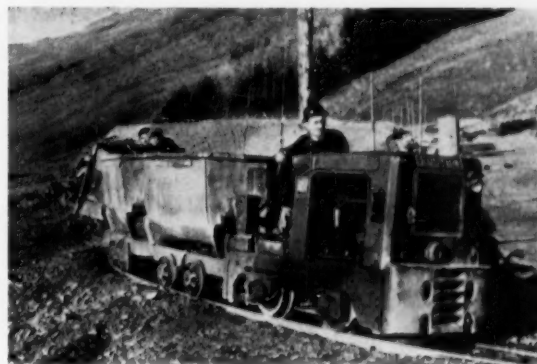
The area of land to be worked for coal is about 720 acres. The site will be restored progressively as work proceeds, on similar lines to Acorn Bank except that the employment of special machines as developed on the German brown coal opencast mines will enable an even more rapid rate of restoration to be achieved. The coal will be cleaned and screened at the Widdington and Linton Disposal Centres.

### Heavy Haulage by Diesel Locomotives

During recent months several British equipment manufacturers have gained an added prominence through the rapid progress achieved in tunnelling operations at the hydro-electric projects being undertaken in the Scottish Highlands. From time to time in these columns the British, European and World tunnelling records established at Breadalbane have been described, while in addition other fast operations were accomplished on the Glen Almond-Lednock and the Dalchonzie tunnels.

While in previous reports more attention has been given to drilling and spoil shifting equipments, the actual task of spoil haulage from the working face should not be overlooked as a major factor in the efficiency and speed of tunnelling. News has lately been received to the effect that Ruston locomotives were employed in spoil haulage on all the projects mentioned.

At Breadalbane spoil haulage is being handled by 15 Ruston Mark L.B.U. narrow-gauge diesel locomotives, while each of the Ruston units operating at Dalchonzie is estimated to have



One of the 15 Ruston Mark LBU diesel locos operating on the scheme

travelled approximately 10,000 miles. Two L.B.U. locos worked at each end of the Glen Almond tunnel, the total rock aggregate removed by the four machines amounting to 116,000 tons, while the mileage covered totalled a little over 30,000 miles.

The Ruston Marks L.A.U. and L.B.U. narrow-gauge underground diesel locomotives are the smallest in the comprehensive range of machines built entirely in the company's Lincoln and Grantham works. These models cover a range from 3½ to 4½ tons working weight and, fitted with an exhaust conditioner of the highest efficiency, are intended for operating in naked flame workings. The power unit is a Ruston vertical four-stroke cycle diesel engine and the Ruston-designed-and-produced oil-operated fully constant mesh gearbox is incorporated, which gives a choice of two or three speeds in either direction.

Controls are limited to three short hand levers, giving engine speed control, speed gear change, and forward and reverse, whilst, in addition, a quick action lever-operator brake is fitted. An outstanding feature of the engine is its ability to produce full torque right down through the speed range, thus ensuring that full tractive effort is available under all conditions.

### Power Germanium Rectifier

The first power germanium rectifier to be put into normal commercial service in the United Kingdom was manufactured by The British Thomson-Houston Co., Ltd., to the order of Imperial Chemical Industries Ltd.

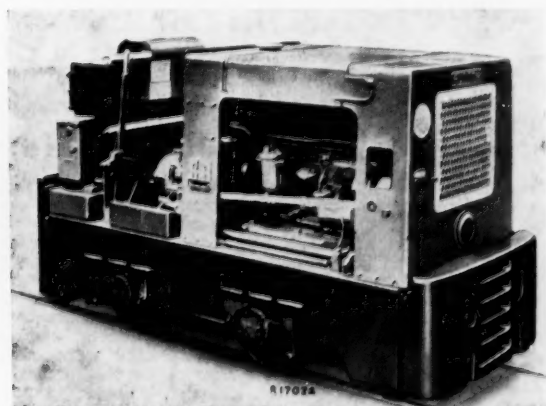
The rectifier, recently commissioned, is rated 1,000 kW., 255 volts, 3,920 amp. and it will operate at continuous full load for long periods. It consists of two cubicles housing a series-parallel arrangement of air-cooled germanium rectifier cells connected to form a six-phase, full-wave bridge. The rectifier is supplied from an existing delta/diametric connected transformer which previously supplied a rotary converter.

The British Thomson-Houston Company is also supplying 10 mechanical contact rectifiers, each rated 3,300/4,050 kW., 220/270 volts, 15,000 amp., to I.C.I.

### New Vacuum Gauge

The latest addition to the range of vacuum equipment manufactured by Edwards High Vacuum Ltd. is the Philani, a combination of the Philips and Pirani type gauges. This instrument is useful where it is desirable to measure pressures in various parts of the vacuum system such as the rotary pump backing line and the high vacuum chamber. The unit has a pressure range of from 0.5 to  $10^{-10}$  m.m. of mercury.

Separate circuits are provided for each gauge with only the power supply and meter in common. The gauge is available for both bench-mounted and panel control units.



The Ruston Mark LBU diesel locomotive for underground haulage



## METALS, MINERALS AND ALLOYS

**COPPER.**—Copper is still in keen demand in spite of the strength of bearish feeling. In the United States, the producers are maintaining their price at 43 c. and the custom smelters at 45 c. per lb. Some of the custom smelters say that they are sold out now for the remainder of the year, but there is a marked reluctance as yet to cover requirements into the New Year. It is less easy to attribute this strong demand to end-year buying for inventory than to the scare of the one-day strike in Chile and to the unsettled state of wage negotiations in Rhodesia.

The strike in Chile is over, but it ended in as confused a manner as it began. If there was a genuine issue it has not yet been fully disposed of, and if there was not the miners have demonstrated their strike-happy mood. In Rhodesia both wage negotiations have passed through the stage of conciliation without achieving a settlement and the parties are now discussing acceptable terms to put up to arbitration. The conclusion of these wage claims is quite unpredictable at the moment.

A situation has developed in which a threat of a strike is as harmful to copper's interests as a strike itself. Consumers are being forced to stock up, if they can, against stoppages which may materialize. But stocking up copper at its present price and under the present credit squeeze is a very expensive business. The pressure to change over to aluminium on those consumers which can afford the capital outlay involved must be very strong. Indeed, Rhodesia itself has found it irresistible and the advertisements for tenders for transmission lines for Kariba specify steel cored aluminium because the use of copper conductors would increase the cost of the whole scheme by not less than £6,500,000.

This problem of the scarcity and cost of copper was also referred to by Mr. D. B. Clayton, President of the National Electrical Contractors Association. Speaking at the annual convention in New York recently he said: "I do not believe that the electrical construction industry will pay such prices if substitutes can be found. . . . Is there going to be sufficient copper? It certainly looks uncertain now." Recent history, of course, shows Mr. Clayton to be wrong. Consumers have paid and are paying fantastic prices for very large quantities of copper. Nobody knows how long they will continue to do it, but they have already done it for far longer than anybody expected.

These problems of copper supply, price and so on will be discussed at the next meeting of the International Wrought Non-Ferrous Metal Council Conference which opens in Paris on November 17. Delegates are expected to hear reports on the extent to which the process of substituting aluminium for copper has progressed. It must be hoped that some reliable statistical information will be presented because, apart from announcements by individual firms of their intention to make the change, there is nothing to go on but surmise.

A new copper mine has been brought into operation in Spain near Barco de Avila in Avila province. The new mine is called Santa Teresa and is reported to yield very high grade ore. A new road is to be built to the mining area.

In a *Reuter* despatch from Santiago, quoting "well informed sources," it is stated that the Chilean government is believed to have decided to authorise all revenue from copper exports by American companies to be converted at a rate of 300 pesos to the dollar. This would replace the level of 200 pesos agreed last August to cover the basic output figure of 420,000 tons. For production above that figure conversions were to be made at various rates between 245 and 300 pesos. It is also stated that the exchange for certain goods at 110 pesos will be abolished from January.

**LEAD.**—There has been a fairly active market in lead on the continuing basis of 15½ c. per lb. New York but without any sign that the price might rise further. Stocks at smelters and refiners on October 1 were down to 23,292 against 26,859 tons a month earlier. They are now at the lowest level for some years. Meanwhile the September figures for deliveries of replacement batteries show the highest level since October, 1952; they amounted to 3,045,000. It seems probable now that the output of 1954 will easily be surpassed. It is also possible that the October figures (always the peak for the year) when they come will establish a new record which at present stands at 3,178,000 delivered in October, 1950. Furthermore there is now a much stronger demand for 12 v. batteries which use 30 per cent more lead than the 6 v. type.

**TIN.**—Tin has eased perceptibly in New York following the settlement of the Nigerian strike although there was a steady undertone to the market in the past week. From the high point of 97 c., spot Straits metal has declined to 96.25 c. per

lb. There is, however, nothing on the horizon to cause any serious disturbance one way or the other in price of metal.

A longer view was taken by Mr. G. F. Gripper, the retiring Chief Inspector of Mines in Malaya. He called for a "new deal" for the mining companies. "They are now just keeping their heads above water. . . . It is becoming increasingly difficult for them to get land for fresh operations after working out a section." He called for more prospecting, more land for mining and more mines to be opened up. "Industry cannot keep up the present rate for long. In fact I am surprised it is doing as well as it is." He added that there are 10 dredges, worth about 6,000,000 straits dollars lying idle for lack of land to work. Asked whether he thought that Malaya was still a good investment for mining capital, he said: "I cannot comment on that, but I have no doubt the Government will bear in mind the importance of mining both as a direct producer of revenue and as a contribution to the general prosperity of the country."

All of this cannot be said too often although it is good to hear it come from one of the outstanding experts on mining in Malaya. The gap in prospecting is now an appalling one. With output in Bolivia falling quickly away, with Indonesia always an uncertain quantity, the responsibility for maintaining reasonable supplies falls heavily on Malaya. Another runaway price such as the Korean war produced might be fatal to the metal. Furthermore the outlook for natural rubber is far from assured and Malaya may be even more dependent on tin in the future than it has been in the past.

A particularly pointed criticism of the Bolivian Government's handling of the tin industry since nationalization has been published in the Bolivian review *Economia*. Apart from the often repeated complaints that the best men have left the industry, and that development work has fallen to a very low level, the review pointedly says that there is not a single person either on the Board of Comibol or on the managements of its central office that can "read a blue-print or a technical report and understand them".

*Economia* is especially interesting on the subject of costs which are closely guarded secrets in Bolivia. The average costs in 1953 were, it is said, \$1.03 per lb. Present average is unknown but it claims it is "a matter of public knowledge" that in the Unificada mine at Potosi the costs are above \$2.80 per lb. and that there are other mines where the costs are higher. With tin fetching around 96 c. in New York these figures are quite extraordinary. Again, the review says that in 1953, 155 bolivianos to the dollar were paid for tin receipts, but that since March, 1955, the rate has been 510 to the dollar. It further adds that Comibol's indebtedness has increased from 9,562,182,365 to 20,236,392,709 bolivianos.

It is quite impossible to confirm or deny these figures but they may not be far out of line. Certainly if the private mines have seen their costs pushed up in the same way it is not surprising that their output has fallen for they would be denied the advantage of currency juggling to help make good their losses. In general, however, the story confirms the impression that is gaining hold that the government is no longer interested very much in the industry; for one thing it would have to make its own supporters toe the line before the mine could be made profitable and the miners are a difficult crowd to handle; for another the government finds the policy of diversifying the economy to make it self-supporting and thus independent of the tin industry and its exchange earning power a far more attractive one.

**ZINC.**—Zinc has been a featureless market with the price of 13 c. per lb. E. St. Louis completely accepted.

Recriminations on the unsuccessful attempt to raise the price by ½ c. continue. A letter from the secretary and president of the American Die-casting Institute to Mr. Otto Herres says that "the current earnings reports of the metals producers are not indicative of hardship". It adds "We can no more agree that they (the rises in the prices of copper and aluminium) provide a logical, warranted, or necessary gauge of the price increase for zinc than we can accept the apparent use of the stockpile as an economic lever to increase prices". Further the letter claims that Mr. Ince, of St. Joseph Lead said that the rise from 12½ to 13 c. "appears to have just about compensated miners and smelters for the higher cost resulting from this year's round of wage increases", and that this proves their point that the rise from 13 to 13½ c. was indefensible. Finally the letter states, "We also note your objection to governmental regulation of prices, or to subsidies, or to quotas as well as the distortions of the channels of trade brought on by the controls and foreign aid policies adopted during the Korean emergency. Do the

miners feel that protective tariffs, depletion allowances, or economic stockpiling are similar distortions?" Certainly the zinc producers are having a difficult time living down that unfortunate gamble.

Slab zinc production in the United States in October reached 89,450 tons, the highest monthly output for this year; the breakdown was special high grade 33,915 tons, prime western 43,678 tons, high grade 7,768 tons and intermediate 2,089 tons.

**ALUMINIUM.**—A new international company, Société Civile d'Etudes Hydro-electriques du Konkoure et du Kouilou, has been formed to help to expand the aluminium industry in French Africa.

This new enterprise was constituted under the auspices of the French Overseas Ministry (see last week's issue, page 522) with the participation of the French aluminium group—Pechiney-Ugine; the Italian firm—Montecatini; the German firm—Vereinigte Aluminium Werke; and the Swiss firm—Société Anonyme Suisse pour l'Industrie de l'Aluminium. The company will determine the financial and technical background for the construction of hydro-electric power for the scheme. Investigations have already established that either the Konkoure River, French Guiana, or the Kouilou River, French Equatorial Africa, could produce 6,000,000 kW. hours per year, which would enable an output of 250,000 to 300,000 tons of aluminium annually.

**COBALT.**—A new deposit of cobaltiferous ore is reported to have been found at Mungana in North Queensland, near the Red Cap Mine which was the main supplier of ore for the smelters operated by the Queensland Government at Chillagoe during war and early post-war years. Although the new field is estimated to contain 1,000,000 tons of ore no information is as yet available regarding its grade or other constituent metals.

**NICKEL.**—Nickel scrap, which is currently commanding "black market" prices, about twice the value of the primary metal, is the subject of a report prepared by the U.S. Bureau of Mines minerals division. The report points out that while the total consumption of nickel scrap was virtually the same in 1954 as in 1953, total nickel recovery was greater in 1954 because of the increased consumption of unalloyed scrap.

Based on preliminary figures the report estimates that secondary nickel recovered from non-ferrous scrap in 1954 amounted to 8,700 s.tons, valued at \$10,900,000, representing an increase of 4 per cent in quantity over the 8,400 s.tons valued at \$10,400,000 recovered in 1953. The source of the largest recovery of secondary nickel was copper base alloys; it supplied 2,800 s.tons in 1954 compared with 3,000 s.tons in 1953. The second largest source of recovery was from the nickel in nickel scrap added to melts and steel alloys which yielded 2,000 tons or 23 per cent of the total secondary nickel recovered against 18 per cent in 1953.

Sherritt Gordon Mines, which commenced nickel production in August, 1954, is now producing at a rate of from 8,500 to 9,000 s.tons of nickel annually.

**URANIUM.**—A government statement in the House of Commons earlier this week disclosed that Britain is receiving its fair share of the uranium allocated by the Combined Development Agency to the Atomic Energy Authority. The Minister of Works, in making this announcement, added that it was not possible to say what procurement of uranium would take place independently of the combined agency, but government assistance would be given where desirable and practicable. At the same time he refused to be drawn into declaring what quantities or proportions of uranium were allocated as between the United Kingdom and United States.

From Wellington, New Zealand, comes the interesting news this week that two prospectors have discovered what they claim to be one of the richest uranium strikes in the world. Samples of the radioactive minerals found by the prospectors near Buller Gorge, on the west coast of South Island, have been lodged with the Government Geological Survey.

## The London Metal Market

(From Our Metal Exchange Correspondent)

At the present time dealers are very reluctant to make any prophecies as to the immediate course of the copper prices, as there appears little justification for the recent rise other than regarding it as a natural corrective to the very steep fall from £396 to £336 per ton which took place in the short period of five weeks and which resulted in the London market losing several thousand tons of copper to the United States.

Some people consider that the further expected recession in

the London price will not take place until after a period during which shipments of copper from the U.S. to the U.K. are possible: others think that end-of-year considerations are playing a part and that prices will remain about the present level until the end of December, after which there will be a fairly rapid fall: others again feel that the market is drifting but that the continually expanding output of copper will make itself felt in the near future. Trying to strike an average, it appears the general opinion is that the nearby outlook favours the present price level with the expectation that an appreciable downward movement will start early in 1956.

Stocks of tin in London Metal Exchange warehouses have continued to fall, but the backwardation has remained steady at around the £18-£20 p.t. mark. Demand throughout the world continues good, and there seems little reason to expect any recession in the price level. There might be some temporary increase should it become necessary for metal to be re-routed via the Cape in the event of the situation in the Near East deteriorating further. On Thursday morning the Eastern price was equivalent to £761½ per ton c.i.f. Europe.

Lead and zinc have remained uninteresting, but with turnovers sufficiently large to damp down any movements which looked as if they might cause any appreciable price alteration.

Closing prices and turnovers are given in the following table:—

	November 3		November 10	
	Buyers	Sellers	Buyers	Sellers
<b>Copper</b>				
Cash .....	£364	£365	£367	£368
Three months .....	£350½	£351	£356	£357
Settlement .....		£365		£368
Week's turnover .....		5,350 tons		6,325 tons
<b>Tin</b>				
Cash .....	£768	£770	£769	£771
Three months .....	£750	£752	£750	£751
Settlement .....		£770		£771
Week's turnover .....		710 tons		620 tons
<b>Lead</b>				
Current half month .....	£106½	£106½	£107	£107½
Three months .....	£106	£106½	£106½	£107
Week's turnover .....		4,000 tons		2,425 tons
<b>Zinc</b>				
Current half month .....	£90½	£91	£91½	£92
Three months .....	£90½	£90½	£90½	£91
Week's turnover .....		3,450 tons		3,300 tons

## OTHER LONDON PRICES — NOVEMBER 10

### METALS

Aluminium, 99.5%, £171 per ton	Nickel, 99.5% (home trade) £519 per ton
Antimony—	Osmium, £24/27 oz. nom.
English (99%) delivered, 10 cwt. and over £210 per ton	Osmiridium, £40 oz. nom.
Crude (70%) £200 per ton	Palladium, £7 10s./£8 0s. oz.
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.	Platinum U.K. and Empire Refined £32 10s. oz. Imported £38 0s. oz.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Rhodium, £40.
Cadmium 11s. 6d. lb.	Ruthenium, £17 oz.
Chromium, 6s. 11d./7s. 4d. lb.	Quicksilver, £90 10s./£91 ex-warehouse
Cobalt, 21s. lb.	Selenium, 72s. nom. per lb.
Gold, 249s. 8½d.	Manganese Metal (96%-98%) Silver, 79½d. f.o.z. spot and 79d. f.d.
Iridium, £30 oz. nom.	Tellurium, 15s./16s. lb.
Magnesium, 2s. 4d. lb.	

### ORES, ALLOYS, ETC.

Bismuth .. .. .	65% 8s. 6d. c.i.f.
Chrome Ore—	60% 8s. 3d. lb. c.i.f.
Rhodesian Metallurgical (semi-friable) 48% ..	£15 2s. 6d. per ton c.i.f.
Refractory 45% ..	£14 2s. 6d. per ton c.i.f.
Smalls 42% ..	£12 2s. 6d. per ton c.i.f.
Magnesite, ground calcined ..	£26-£27 d/d
Magnesite, Raw ..	£10-£11 d/d
Molybdenite (85% basis) ..	105s. 0d.-108s. 0d. per unit c.i.f.
Wolfram and Scheelite (65%) ..	240s. 0d./245s. 0d. c.i.f.
Tungsten Metal Powder ..	20s. 2d. nom. per lb. (home)
(98% Min. W.)	
Ferro-tungsten (80%-85%) ..	17s. 2d. nom. per lb. (home)
Carbide, 4-cwt. lots ..	£39 3s. 9d. d/d per ton
Ferro-manganese, home ..	£54 10s. 0d. per ton
Manganese Ore Indian c.i.f.	
Europe (46%-48%) basis 100s. freight ..	84d. per unit c.i.f.
Manganese Ore (38%-40%) ..	69d. per unit
Brass Wire ..	3s. 4½d. per lb. basis
Brass Tubes, solid drawn ..	2s. 9½d. per lb. basis





## COMPANY NEWS AND VIEWS

### Gold Fields Maintains 17½ Per Cent

With the recommendation of a dividend amounting to 17½ per cent on its issued ordinary capital of £4,500,000 in £1 shares The Consolidated Gold Fields of South Africa has maintained its distribution for the year ended June 30, 1955 at the previous year's level.

Profits of the company's wholly owned subsidiary, New Consolidated Goldfields, for the past financial year (subject to audit) amounted to £1,828,726 (£1,618,278). After taxation of £880,000 (£662,000); a transfer to investment and exploration reserve of £350,000 (£250,000); provisions for pensions £30,000 (£150,000); preference dividends £100,782 net (£99,000) and £452,812 (£433,125) in respect of ordinary dividend, the amount carried forward was slightly higher at £368,110 as compared with £352,978.

Meeting, London, December 8, 1955. Mr. R. Annan is chairman.

### Points of Interest From Recent Gold Fields Group Meetings

#### Venterspost's Middlevelei Agreement

An interesting feature of Venterspost Gold Mining Company's report and accounts for the year ended June 30, 1955, concerned an agreement entered into with the Middlevelei Estate and Gold Mining Company. This involved an undertaking to drive into the Middlevelei property for the purpose of prospecting economic possibilities of the Main and Ventersdorp Contact Reefs in an area to the north of the Venterspost property. Costs of this prospecting programme will be borne by Middlevelei Gold.

#### Progress of West Drie's Shaft System

West Driefontein's No. 3 shaft was sunk a distance of 1,254 ft. to a total depth of 4,040 ft. during the year ended June 30, 1955. Sinking progress was, however, again retarded by the intersection of water-bearing fissures requiring cementation. The Main Reef was intersected by the shaft at a depth below collar of 3,435 ft. giving values of 56 in. dwts. The Carbon Leader which was intersected at 3,618 ft. averaged 8.6 dwts. per ton over a reef channel width of 26.4 in. equivalent to 227 in. dwts.

In view of delays experienced in sinking No. 3 shaft it was considered advisable, after the completion of the ore and waste pass system at No. 2 shaft, to resume sinking at No. 4 shaft pending the completion of surface installations incidental to the sinking of No. 5 shaft. During December 1954, therefore, No. 4 shaft was restarted and a depth of 1,577 ft. reached by June 30, 1955.

Surface installations for sinking No. 5 shaft were completed during June 1955 and work was started during July. No. 4 shaft will in future be used for alternative sinking operations in the event of serious delays at either No. 3 or No. 5 shafts.

#### Libanon's New Shaft

In order to ensure continuity of mining operations it has been decided to sink a shaft from the surface near Libanon's southern boundary. This shaft, to be known as "Harvey-Watt", is essential for ventilation of the mine and the exploitation of the southern part of the property.

#### Mechanical Sorting at Doornfontein

Doornfontein's report and accounts for the year ended June 30, 1955, disclosed that during December 1954, mechanical segregation of reef from waste by screening was introduced. After technical adjustments in the initial stages operations proceeded satisfactorily with a waste sorting rate in excess of 25 per cent. The substantial increase in ore supply to the mill demanded by this system was met initially by drawing additional tonnage from a low grade reef development dump. Early in 1955, however, hoisting facilities were made available through No. 1 shaft where sinking had recently been completed and full mill requirements were then met from underground sources of tonnage. The improvement in yield resulting from a high sorting rate made it possible to maintain profits in spite of appreciably increased working costs.

During the period when mechanical sorting was being introduced and until the end of the period under review, the value of available stope faces was lower than that of those previously mined. In consequence, the benefits from sorting may not have been fully apparent.

### American Metal's Profits and Dividends Up

With the declaration of a quarterly dividend of 50 c. and a year-end dividend of \$1 per share on outstanding common stock, the American Metal Co.'s cash distribution for the year

ended December 31, 1955, has totalled \$3 per share as compared with \$1.75 during the previous year. A 5 per cent stock dividend has also been announced as for 1954.

Consolidated profits for the nine months ended September 30, 1955, rose steeply to \$11,122,199 from \$4,885,990. Taking dividends, etc., into account total income advanced to \$19,153,053 from \$11,152,722.

### Gold Fields May Make 1 for 6 Share Offer for G.F. Rhodesian

§ The Consolidated Gold Fields of South Africa are negotiating for the purchase of The Gold Fields Rhodesian Development Company by way of a share exchange in the ratio of 1 for 6.

Gold Fields Rhodesian have stated in a circular to its shareholders that it might be possible to communicate the formal offer on or about December 12. Meanwhile its Annual General Meeting has been put back from December 7 to December 20.

### Casts Maintains 75 Per Cent

Consolidated African Selection Trust has announced a final dividend of 60 per cent for the year ended June 30, 1955, on its issued ordinary capital of £1,516,555 in ordinary stock units of 5s. Together with the previous interim of 15 per cent this brings total distribution to 75 per cent, thereby remaining unchanged from that of the previous year.

Combined profits were down to £2,067,447 from £2,227,975. But after lower taxation of £1,174,750 (£1,412,000) the year's surplus rose to £892,697 (£815,957). Dividends absorbed £654,014 (£625,579) and £359,805 (£323,067) was carried forward.

Meeting, London, December 15. Mr. A. Chester Beatty is chairman.

### Some Features From W.M.C. Group Meetings

Recent meetings of companies in the Western Mining Corporation Group, presided over by Mr. G. Lindesay Clark, included that of Great Western Consolidated. Mining costs at this property (both in the quarry and underground) for the current year ending March 31, 1956, were nearly 4s. per ton above the average of the previous year. The major contributory factor for this was an increase in the stope preparation redemption charge from 5s. 6d. to 12s. per ton. This represented, however, only a temporary rise and was due to the small size of stopes being worked at the present time. An automatic reduction would take place when wider ore bodies were again encountered.

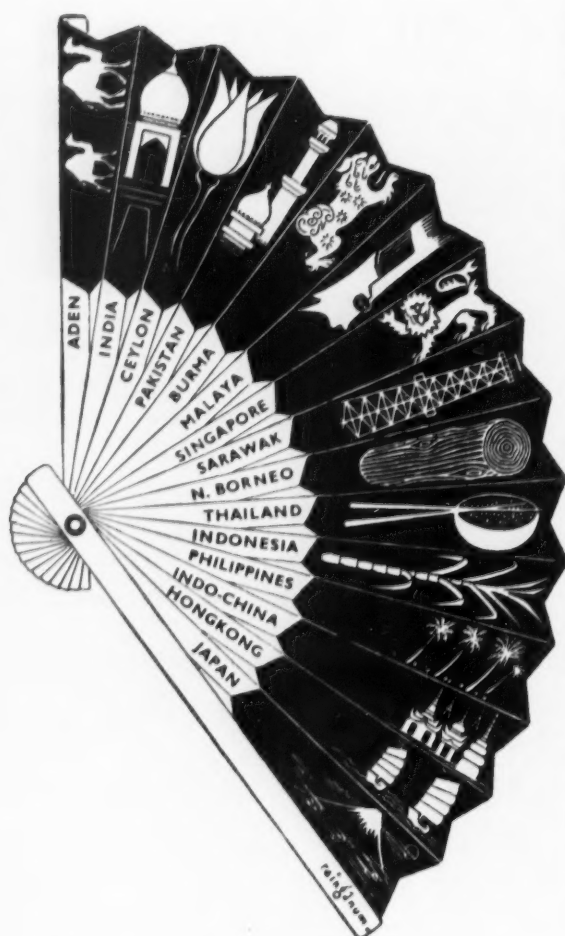
Referring to the completion of recent purchases by Gold Mines of Kalgoorlie (Aust.), of the South Kalgurli, Boulder Perseverance and Enterprise companies, Mr. Clark stated that a beginning had immediately been made on the task of re-organising the mines into one unit. This involved an immense amount of re-mapping and re-assembling of data available on to one group of plans. The object of the programme was, he said, 'to assess the tonnage of ore available at future envisaged costs as well as to indicate areas still justifying further development.' But little use could be made of the data until its collation had been further advanced.

At Central Victoria Dredging Company N.L. the amphitheatre dredge was now proceeding back up to the Avoca Valley and should shortly enter an area where boring had indicated that higher values might be expected for three years or so ahead.

### New Shaft for Harmony

The director's report for Harmony Gold Mining Company in respect of the twelve months ended June 30, 1955, disclosed that since the close of the financial year it had been decided to proceed with the sinking of the second main hoisting shaft (No. 2).

Preliminary work had been put in hand and it is expected to commence sinking with the permanent headgear and winding equipment by the middle of 1956. Cost of the new shaft including ancillary equipment and housing is estimated at £3,200,000. Twin footwall haulages were already being advanced northwards on 17 level from No. 3 shaft to the site of No. 2 shaft and prior to reef development in this area, short boreholes were being drilled to sample the Basal Reef at regular intervals of about 65 ft. It is intended to publish results obtained from these holes together with normal reef development results in quarterly reports. So far, four holes have been completed which averaged 8.81 dwts. over a channel width of 68 in. equal to 599 in. dwts.



## Spanning the East

Branches of The Chartered Bank of India, Australia and China under British management directed from London are established in most centres of commercial importance throughout Southern and South Eastern Asia and the Far East. At all these branches a complete banking service is available and, in particular, facilities are provided for the financing of international trade in co-operation with the Bank's offices in London, Manchester and Liverpool, its agencies in New York and Hamburg and a world-wide range of banking correspondents.

In London and Singapore the Bank is prepared to act as executor or trustee.

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Referring to operations generally the report stated that depending on the supply of labour the milling rate should steadily increase until 80,000 tons per month was reached by the end of 1955. It would not be possible to mill at the rated capacity of 90,000 tons per month until the industry's labour requirements had been met in full.

Mr. P. H. Anderson is chairman. Meeting, Johannesburg, November 14.

### C.M.F.S.A.'s Direct Participation in Saaiplaas

The report and accounts for the year ended June 30, 1955, of Central Mining Free State Areas disclosed that its 10 per cent interest comprising 371,250 shares was retained in New Consolidated Free State Exploration. But although no change was made in the participation, it is interesting that as at June 30, 1955, New Cons. held only 1,247,044 shares in Harmony Gold Mining Company as compared with 1,647,044 shares previously. This reduction of 400,000 shares could, it is thought, have been effected to provide funds for subscription to the recent F.S. Saaiplaas issue.

In addition to the indirect holding in Saaiplaas—acquired through its holding in New Cons.—C.M.F.S.A. was offered direct one share in Saaiplaas for every two held in New Cons. Since the close of the year, 185,625 shares of 10s. each at par in Saaiplaas had accordingly been acquired. Besides this, entitlement to a further 1,591 shares has accrued from sub-underwriting.

Mr. P. H. Anderson is chairman. Meeting, Johannesburg, November 14.

### Rooderand's Prospecting Work with Johnnies

A notable point from the statement to shareholders of Rooderand Main Reef Mines was the reference to prospecting activities which are being carried out jointly with the Johannesburg Consolidated Investment Company.

Mr. L. P. Kent, deputising for Mr. S. G. Menell, referred to what he described as "some promising results" which had been obtained from boreholes in the area of farms Modderfontein No. 4, Waterpan No. 5, Jachtfontein No. 99 on the West Rand. These results he said, had come from the Upper Elsburg and Ventersdorp Contact Reefs. A somewhat complicated geological problem was involved and a considerable amount of work remained to be done before any reliable estimate could be formed as to the areas' economic significance. In these circumstances interim results could be misleading and the parties concerned therefore decided that they would not be published.

### Inco Pays More

The International Nickel Co., of Canada, has declared a quarterly dividend of 65 c. plus an extra year-end dividend of \$1.35 (U.S. currency) on its common shares. Total of distribution for 1955 of \$3.75 thus compares with \$2.90 for 1954.

### Bibiani Estimates 1954-55 Profits Virtually Unchanged

The report from Bibiani (1927) covering three months ended September 30, 1955, revealed little change from that of the previous quarter. From 90,000 s.tons of ore crushed (same), yielding 18,767 oz. of gold (18,750 oz.), total revenue amounted to £235,904 (£235,129). After working costs and general expenses in West Africa and London of £166,001 (£164,763) estimated working profit was £69,903 (£70,366). Estimated profit for the quarter of £29,637 compared with £30,098 during the preceding three months.

Total estimated profit for 12 months ended September 30, 1955 (subject to taxation) at £145,469 compared with an actual figure for the previous financial year of £141,712.

### Fall in Champion Reef's Current Results

In spite of the recent favourable gold price received by The Champion Reef Gold Mines of India (K.G.F.) which averaged Rs. 251 per ounce over the first eight months of the current year ending December 31, 1955, financial results to date were not, Mr. M. A. Sreenivasan, the chairman, said, as good as those in the corresponding period of 1954. This had resulted from a fall in output due to labour strikes and unrest and to a shut-down of the Biddick shaft for three months. During the period January to August 115,670 tons had been milled for a recovery of 41,341 oz. This compares with 120,130 tons and 46,667 oz.

Estimates as at December 31, 1954, indicated ore reserves of 727,993 tons (978,722 tons) with an average grade of 10.02 dwts. per ton (9.95 dwts.). Besides this, probable ore of low grade totalled 86,646 tons (128,153 tons) having an average grade of 3.95 dwts. per ton (3.93 dwts.).



**Favourable Outlook for Nundydroog**

Speaking at the meeting of Nundydroog Mines (K.G.F.) Mr. M. A. Sreenivasan, the chairman, stated that production for the first eight months of the current financial year had been 135,934 tons from which 45,388 oz. of gold had been produced. This compared with 158,882 tons and 49,539 oz. during the previous corresponding period. Compensating for this decline in output—which had been due to an underground fire and unsettled labour conditions—the good price of Rs. 251 per ounce had been received for gold. Provided no setbacks occurred during coming months the current year's financial results should compare favourably with those of 1954.

As at December 31, 1954, the company's ore reserve tonnage available amounted to 765,425 tons (717,203 tons) having an average grade of 9.4 dwts per ton (8.9 dwts.). Besides this, 903,405 tons of probable low grade ore existed as compared with 619,027 tons. Its average grade was 3.55 dwts. per ton as against 3.49 dwts.

**Perak Hydro-Electric To Make Free Issue**

In view of the recent war damage award and progress made in the settlement of outstanding taxation liabilities, Perak River Hydro-Electric Power Company has decided to issue to shareholders one fully paid ordinary share of £1 for every four held at the close of business on November 15, 1955. This will involve the capitalization of £437,500.

**Amalgamated Collieries to Issue 2 for 25 at 45s.**

For the purpose of repaying loans obtained to finance its recent large expansion programme, amalgamated Collieries of South

Africa proposes to issue 250,000 shares at 45s. per share of which 228,800 will be offered to shareholders in the ratio of 2 for 25. Vereeniging Estates, the Company's principal shareholder has undertaken to subscribe for the balance of 21,200 shares at the same price.

**FINAL DIVIDENDS AND PRELIMINARY FIGURES**

Name of Company	Year ended	Final Dividend %	Net Profit After Tax		Total Dividends	
			This Year £(000)	Last Year £(000)	This Year %	Last Year %
C. Afr. Sel. Tst.	30. 6.55	60	892.7	815.9	75	75
Trin. Leases	30. 6.55	16½	2,312.7	1,851.6	21¼a	20
S. Malay Tin	30. 6.55	6½	317.3	368.4	80	46½b
L. George c	30. 6.55	Nil	Dr. 3.7	Dr. 32.0	Nil	Nil
C. Gold Fields	30. 6.55	17½	948.7	956.3	17½	17½
Naraguta Ex.	31.12.54	4	0.13	Dr. 4.2	4	5
Kern Oil d	31. 5.55	25	312.7	343.1	25	25
Lake View e	30. 6.55	37½	170.0	167.4	56¼	56¼
Kepong Dredg.	30. 6.55	5	4.4	Dr. 7.6	5	Nil

a Tax free.

b First interim of 20% paid before 233¼% scrip issue.

c Profit figures struck after providing £166,286 maintenance and rehabilitation of property during shutdown. Also £28,735 (£72,237) for depreciation.

d Dividend includes bonus of 7½% (7½%). Net profit figures struck after £171,263 for depreciation (1954—£122,023).

e Net profit struck after depreciation of £31,439 (1954—£27,152).

**THE CEMENTATION COMPANY LIMITED****LARGER PROFITS****MR. A. R. NEELANDS' STATEMENT**

The 35th annual general meeting of The Cementation Company Limited, will be held at Grosvenor House, Park Lane, London, W., on December 6.

The following is an extract from the statement by the Chairman, Mr. A. R. Neelands, circulated with the report and accounts:—

The trading profits of the Group for the year ended March 31, 1955, at £632,140 are £30,541 greater than last year.

Taxation is reduced by £30,528 to £371,755, mainly as a result of the cessation of the Excess Profits Levy and the net charge is further reduced by bringing in £62,000 from Taxation Equalisation Reserve.

We have decided to transfer to General Reserve the sum of £100,000 and to recommend a dividend on the Ordinary Shares of 12½%, requiring £105,117 (after Income Tax), leaving to be carried forward to next year £108,850.

The financing of major contracts, particularly those where competition is international, is a considerable strain on the Group's liquid resources. During the year under review the Group expenditure on capital items has been of the order of £800,000.

**WORLD WIDE ACTIVITIES**

The most important of our recent ventures has been the purchase of the controlling interest in Diamond Drillers Limited, now registered as "The Cementation Co. (New Zealand) Limited".

We are somewhat concerned about the present sterling shortage in Turkey but would like to say that during our years of contracting in that country contract terms have been honoured to the letter. Excellent progress has been maintained on the three Schemes at Armutcuk, Karadon and Catalgazi, thus we would expect to complete the first two shafts before March 31, 1956.

We have again been responsible for a large proportion of the National Coal Board's shaft sinking and development programme. The Hem Heath Shaft was completed during the year and several other shafts are approaching completion. The Coal Board's plans however provide for a considerable volume of prospective work and we are maintaining our position in meeting competition in this activity upon which we have been engaged for nearly 50 years.

**IMPORTANT CONTRACTS**

Apart from a large volume of specialised cementation work in England we completed successfully two important contracts—one in India and one in South Africa—for the strengthening and raising of existing water storage dams by the stressing of cables anchored into the foundation rock.

Although competition abroad is increasing, we are main-

taining our fair share of business. Work commenced on the military hospital in Cyprus and we completed the arrangements for the large rock sealing work at Dokan Dam—one of the largest operations of its kind in the world—where we are working in co-operation with Entreprises P. Bachy of France.

At home, the Lawers Hydro Electric Project in Scotland made very satisfactory progress. The contracts for the river channel deepening and barrage connected with the Erne Hydro Electric Scheme and the drainage of Lough Erne, are well ahead of schedule.

Our piling business has had a successful year. Two important foundation contracts were for buildings of public interest—Bucklersbury House in the City and the new Coventry Cathedral.

The Cementation Co. (Africa) (Pty.) Ltd., continues to grow in strength, both in so far as its mining works are concerned and also in specialised civil engineering.

As a result of some three years' work on site investigations for the Southern Rhodesia Irrigation Department, the Group has been awarded a £1½ million contract for preliminary works on the Kariba Scheme.

John Thom Limited have well maintained their turnover and position in the fields of drilling. This Company has recently completed the deepest diamond core-drilled borehole in Great Britain, obtaining cylindrical samples of strata from surface to 4,604 feet.

The volume of sales, turnover and profit of Thermacoust Limited all showed a further steady increase. After much experimenting a successful method of producing a plaster-faced slab has been developed.

**GEOPHYSICAL PROSPECTING**

We have always regarded The Geophysical Prospecting Company as a long-term venture and I am very pleased to say that the Company has this year shown a marked improvement in profits.

It is also encouraging to note that The Geo-Technical Development Co. Ltd., which is concerned with mineral, including uranium prospecting, had a record turnover in 1954 and 1955 and that there is every prospect of this being maintained.

In North Africa, the Compagnie de Prospection Geophysique Nord Africaine made a small loss on its first nine months to March 31, 1955, but this has been balanced by a small profit in the first quarter of this year. It has good contracts in hand.

Quickset Water Sealers Ltd. continues to carry out many important waterproofing contracts in all parts of the country. Betonac Flooring Aggregate continues to be in demand by the building industry.

## THE PERAK RIVER HYDRO-ELECTRIC POWER COMPANY

### FURTHER SATISFACTORY PROGRESS

The 29th annual general meeting of The Perak River Hydro-Electric Power Company Limited was held on November 4 in London, **Mr. Hugh G. Balfour** (the chairman) presiding.

The following is an extract from his circulated statement:—

The Directors' Report and Accounts for the year ended July 31, 1955, show further satisfactory progress. The Power Stations generated 432.1 million units as compared with 389.7 million units in the previous year, an increase of 11 per cent, and the peak load on the system was 67.4 mW., as compared with 64.0 mW. previously.

The Hydro-Electric Station at Chenderoh, owing to a lower average effective river flow, generated only 184.5 million units during the year, as compared with 204.4 million units in the previous year, but the Steam Stations generated 247.5 million units compared with 185.3 million units last year, an increase of 33.3 per cent. The thermal efficiency increased from 18 per cent to 18.1 per cent at the Malim Nawar Station and from 18.4 per cent to 18.7 per cent at the Batu Gajah Station. The heavy loading of these Stations has made the question of maintenance, particularly of boilers, a serious problem as most of this work can only be carried out during the wet months when the Chenderoh Hydro-Electric Station is on full load.

Your Directors have given careful consideration to the question of providing new plant as in planning this it is necessary to have regard to the future construction programme of the Central Electricity Board, particularly as regards the possible development of hydro-electric power in the Cameron Highlands. The situation in this respect is not yet quite clear but, in view of the increasing load on our system, an order was placed during the year for a new 12 mW. turbo-alternator and ancillary 140,000 lb. per hour boiler which is scheduled to go into operation at Malim Nawar during 1958. Further substantial capital commitments for new generating plant may require to be incurred during the next few years.

The Kinta Electrical Distribution Co., Limited, had a satisfactory year. Five new townships were connected to the Company's supply system, and the total units sold at 14.7 million compared with 13.0 million in the previous year, an increase of 13.3 per cent. In addition the Company continues to maintain

and operate for the Government individual generating sets in nineteen new villages. Whilst the trading profit at £59,367 showed an increase of £7,288 over the previous year, the dividend was reduced from 10 per cent to 5 per cent in order to conserve cash for extensions and development.

### CAPITALIZATION OF RESERVES

In an enterprise such as Perak Hydro it is particularly necessary to build up and retain a strong reserve position against the uncertainties of the Far Eastern future. Nevertheless, your Directors feel able to propose the capitalization of £437,500 of the reserves, and the issue to the Ordinary Shareholders of one fully paid Ordinary Share of £1 for every four Ordinary Shares of £1 each held at close of business on November 15, 1955. The consent of H.M. Treasury to this issue has been obtained.

Turning to the Balance Sheet, Current Assets at £1,610,828 exceed Current Liabilities (including income tax provision for 1956/57) by £812,452, as compared with an excess figure last year of £312,157. This degree of liquidity is required in consequence of the order for new generating plant to which I have already referred, and you will see that capital commitments not provided for in the Balance Sheet have accordingly increased from £197,000 last year to £800,000 this year.

The Revenue Account shows that our Gross Revenue, at £1,592,999, is £143,428 greater than last year; against this our expenditure in Malaya has increased by £62,193. After deducting London administration and Directors' fees, and bringing in dividend and interest, the balance transferred to the Net Revenue Account is £910,200, an increase of £78,049 over the previous year. The Directors recommend payment of a dividend on the Ordinary Share Capital of 10 per cent.

With regard to the current year the returns to date are satisfactory, and unless circumstances change adversely I think that the results should be at least comparable to those presented to you this year. In that event there should be no difficulty in maintaining the existing dividend on the increased Ordinary Share Capital.

The report and accounts were adopted and the Board's capitalization and scrip issue proposals approved.

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## Obituary

**ERIC INGRAM MAVOR**

The death has been announced of **Mr. Eric Ingram Mavor**, of Capelrig, Newton Mearns, youngest son of Henry Mavor, the founder of Mavor and Coulson Ltd.

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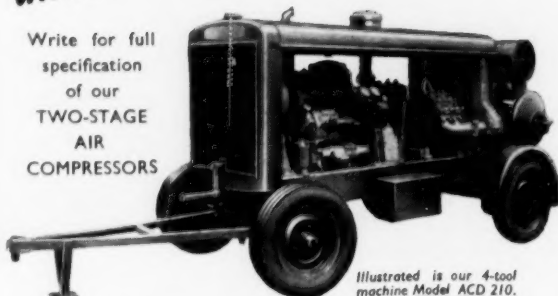
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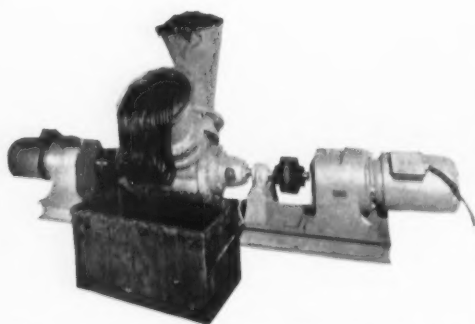
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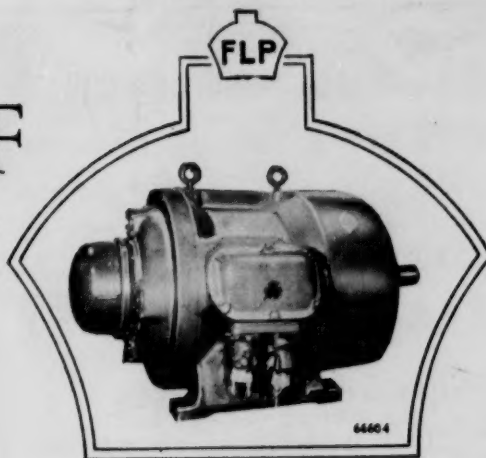
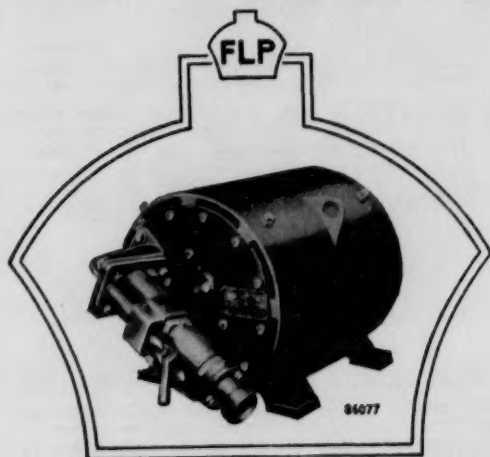
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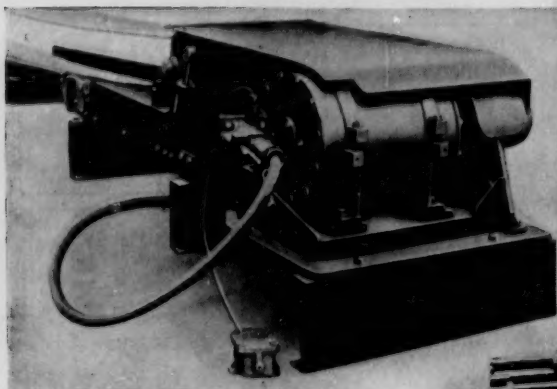
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# FLAMEPROOF



Top Left: *Totally-enclosed fan-cooled flameproof squirrel-cage motor, type KF.*  
 Top Right: *T.E.F.C. flameproof slipring motor, type FW.*

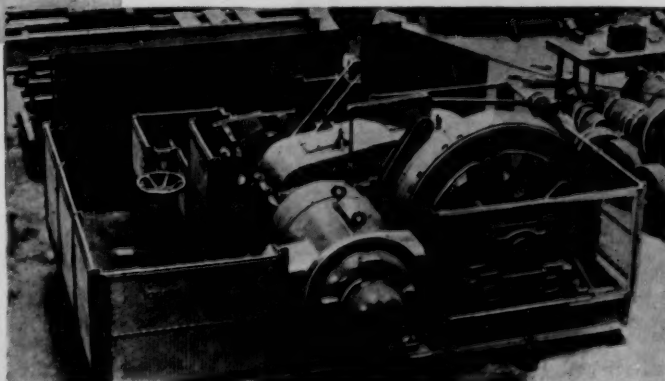
## Metrovick Motors for Mines



76058

Above: *Type KF flameproof motor driving a "Huwood" conveyor.*

Right: *125 hp, 580 rpm totally-enclosed, fan-cooled, flameproof Metrovick slipring induction motor driving Beckett and Anderson "Man-Riding" haulage for a colliery. Electro-hydraulic thruster operating main brake is seen on left of motor.*



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